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AVIATION

The Oldest American Aeronautical Magazine

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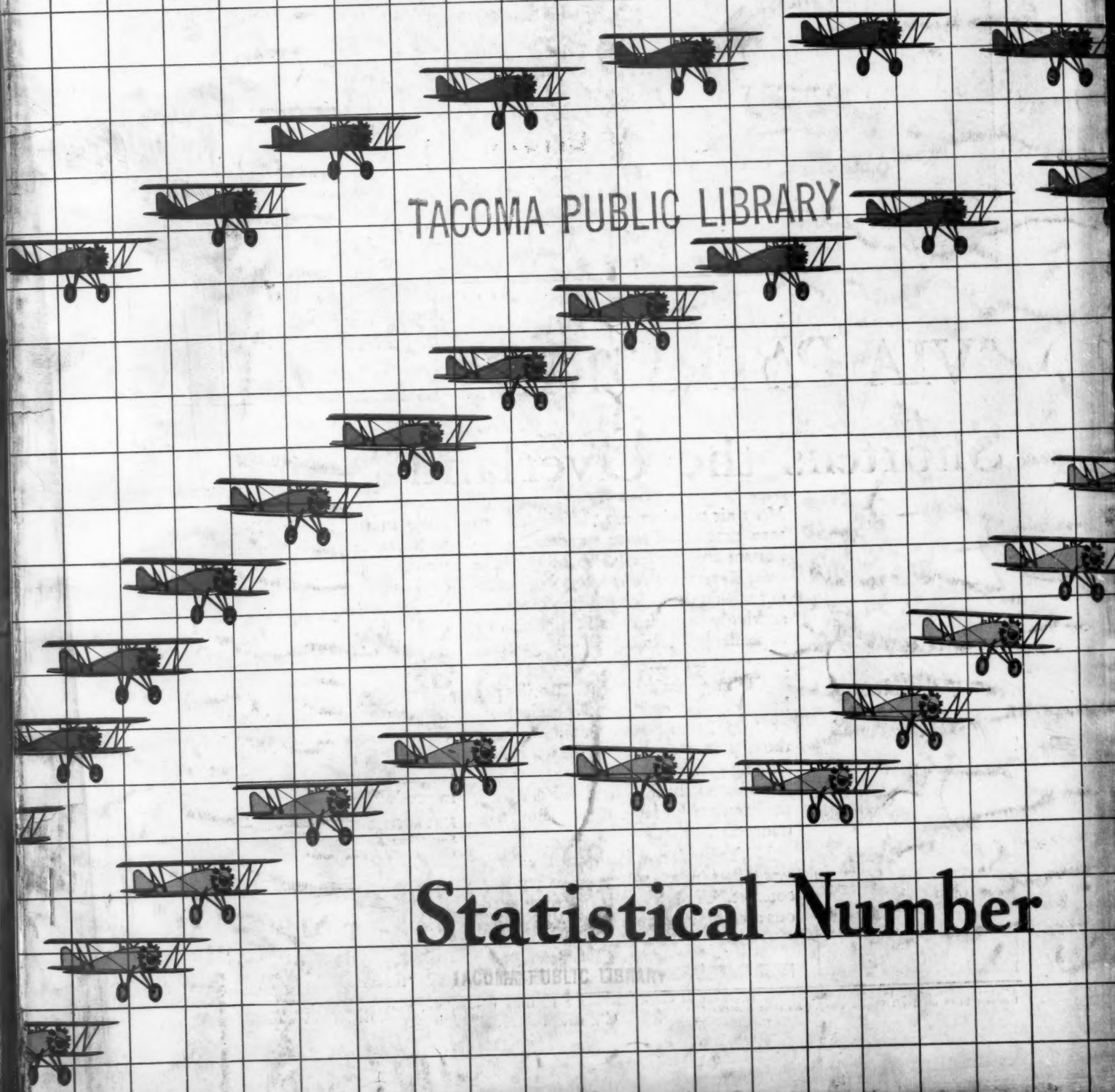

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With superior performance, the *Patrician* offers new features in safety and comfort. Unobstructed vision; luxurious accommodations and freedom from noise in the roomy cabin, combined with ample power reserve and noteworthy improvements in construction, explain the wide public acceptance of the big ship on regular passenger routes. And a remarkably low operating cost of *seven cents per passenger mile,* gives the *Patrician* unquestioned leadership in operating economy, paving the way for lower fares and greater volume of traffic.

For these and many other reasons the *Patrician* is recognized as the most advanced transport for overland service in production today.

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KEYSTONE

"THE KEYSTONE OF SAFE FLYING"

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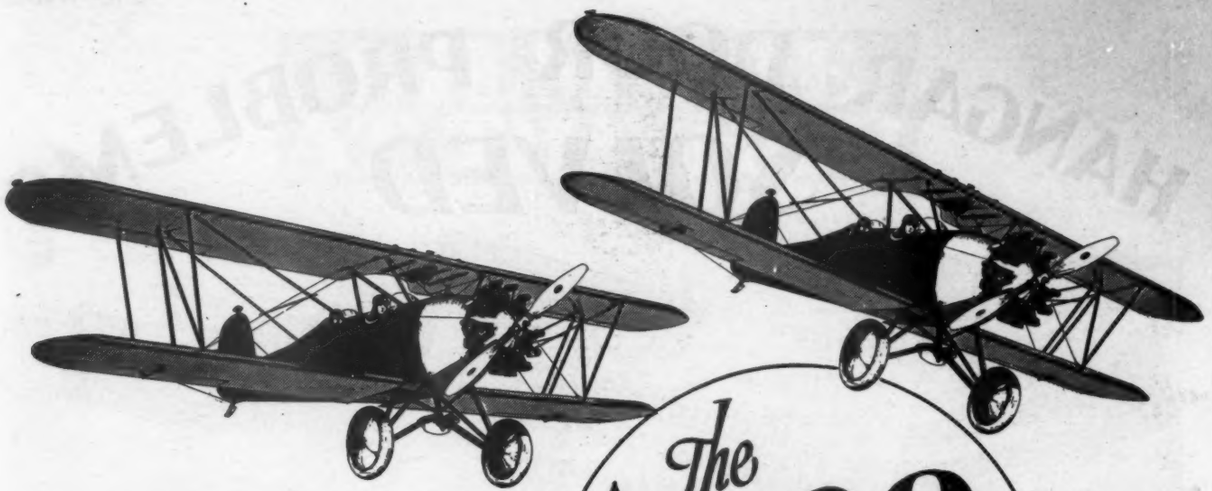

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Offers the Utmost in Air Travel

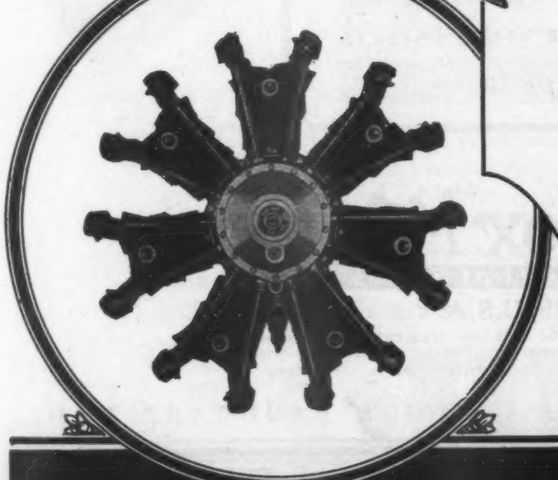
Perhaps it's a week-end pleasure jaunt—or—a before lunch business appointment miles away demands your presence. For either the Hess "Warrior" powered Argo offers the utmost in speedy, dependable transportation.

Small enough to be fast—large enough to carry two in comfort the Argo has made a great name for itself in the small plane field. The appointments are such as you would expect to find in a plane much higher in price. You can cruise at 100 miles per hour or if time is pressing 25 more are yours with ease.

The Argo is powered by our own Hess "Warrior" engine. Both engine and plane bear the Dept. of Commerce Certificate. A seven cylinder, radial, air-cooled engine the Hess "Warrior" develops 115 h.p. at 1925 r.p.m.

Write for information on either the two or three-place "ARGO."

The HESS-WARRIOR AIRCRAFT ENGINE



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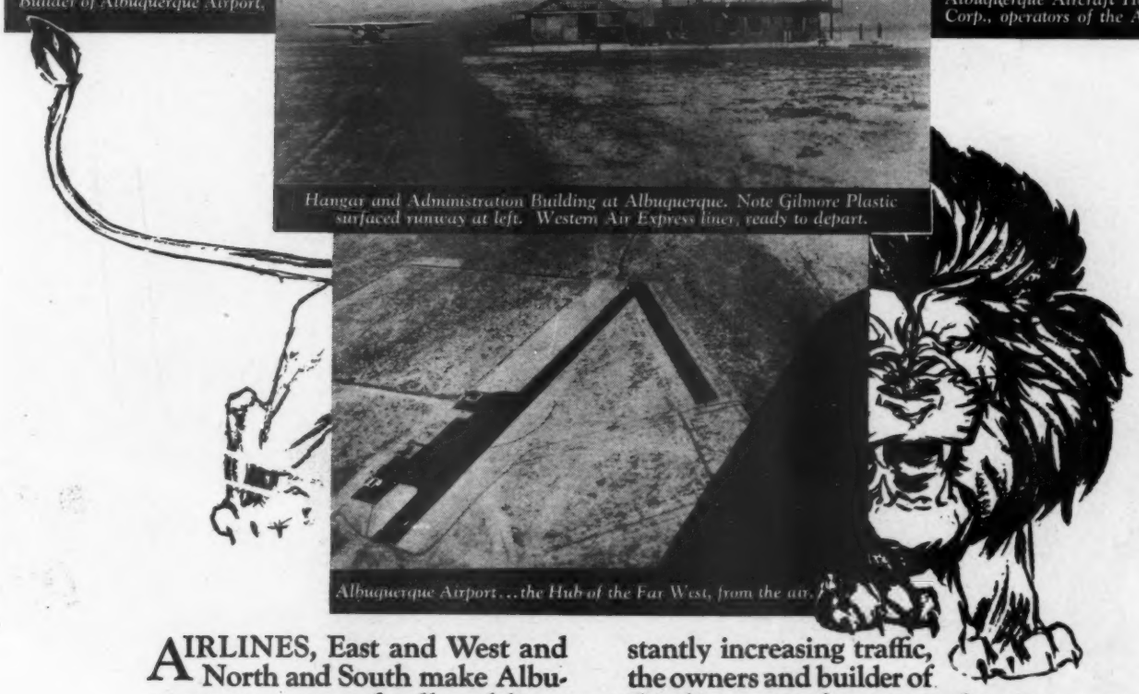
T. A. T. Airliner landing at Albuquerque Airport.

D. E. Dalbey, Vice-President, Albuquerque Aircraft Holdings Corp., operators of the Airport.

Hangar and Administration Building at Albuquerque. Note Gilmore Plastic surfaced runway at left. Western Air Express liner, ready to depart.

Albuquerque Airport...the Hub of the Far West, from the air.



AIRLINES, East and West and North and South make Albuquerque a port of call and have created this into the *Air Hub* of the Far West. In order to provide the most satisfactory landing areas and take-off runways for constantly increasing traffic, the owners and builder of this key-port, after a complete investigation selected Gilmore Airport Oil and the Gilmore Plastic Method of surfacing, perfected by the Gilmore Oil Co., Los Angeles.

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2438 A

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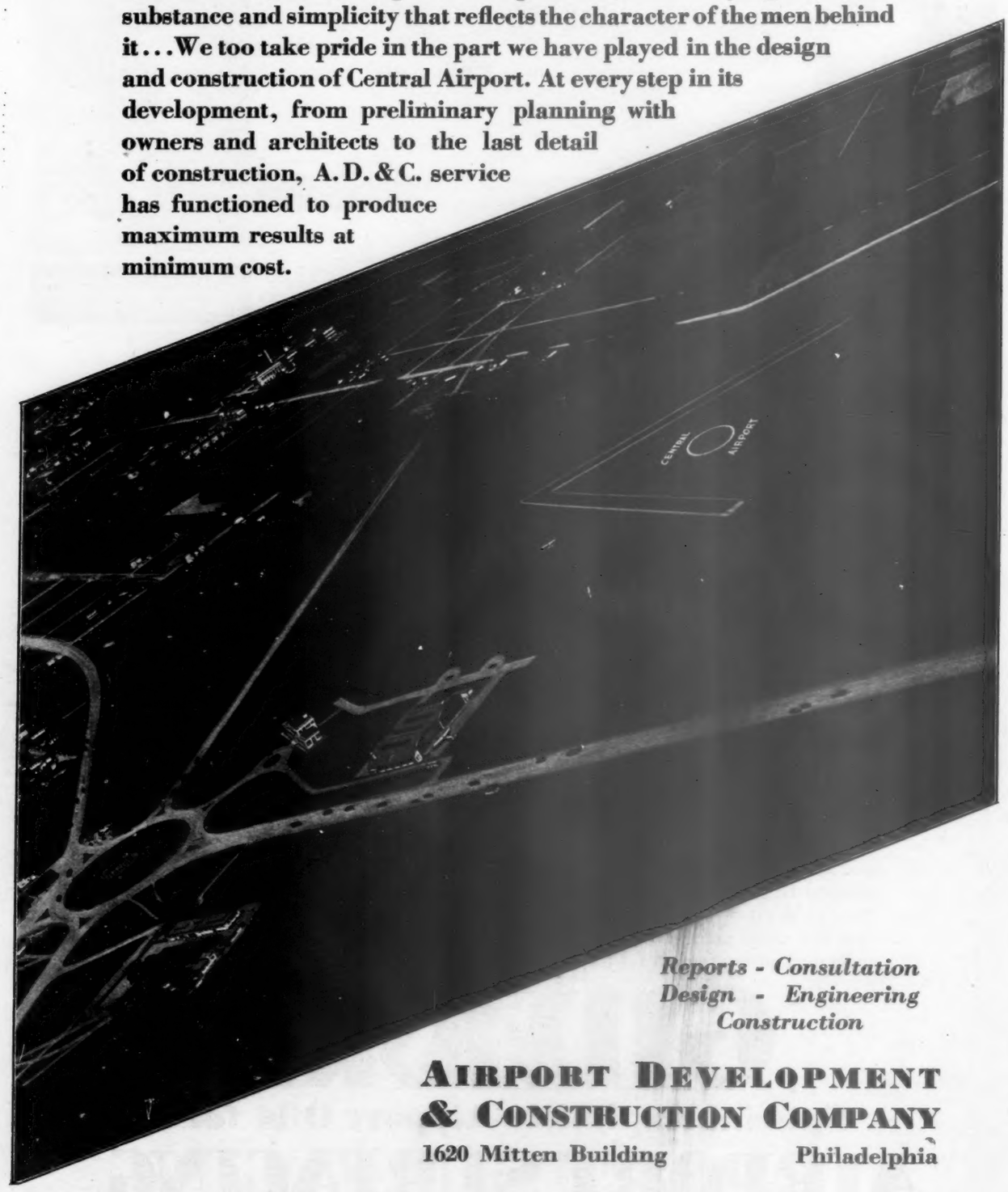
CENTRAL AIRPORT, serving the Philadelphia-Camden metropolitan area, will rank as one of the world's greatest air terminals. Owners and community are alike justly proud of this magnificent achievement, built for practical operation; but carrying an air of substance and simplicity that reflects the character of the men behind it... We too take pride in the part we have played in the design and construction of Central Airport. At every step in its development, from preliminary planning with owners and architects to the last detail of construction, A. D. & C. service has functioned to produce maximum results at minimum cost.



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Design - Engineering
Construction

AIRPORT DEVELOPMENT & CONSTRUCTION COMPANY

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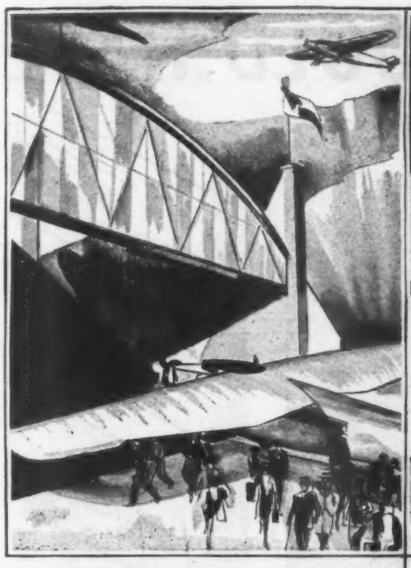

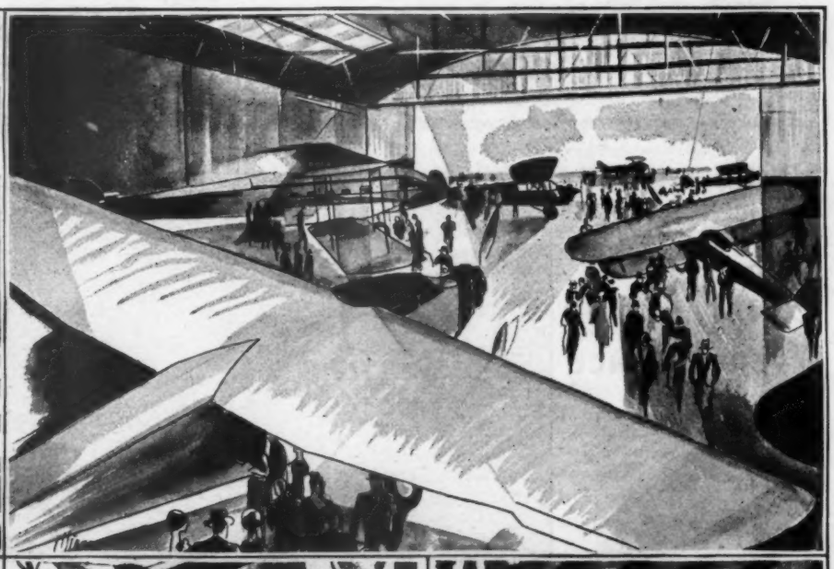

CENTRAL AIRPORT is but 15 minutes' drive from the heart of Philadelphia, over broad highways and the Delaware River Bridge. Among the features of its equipment, in addition to enormous fireproof, heated hangars, are weather service, radio, complete lighting for night flying, ticket and administration offices, waiting and rest rooms, a splendid restaurant, two swimming pools with a sand beach, parking space for 4000 cars. The field has eight runways of 2500 feet, 3600-foot runway in the direction of the prevailing wind, macadam taxi and take-off strips. Perfect natural drainage in all seasons.

CENTRAL AIRPORT is the aviation crossroads of the East. Situated midway between the financial and political capitals of the country, and near to both; at the population center of the Atlantic coast, and almost at its geographical center, Central Airport is the heart of the growing system of eastern airways.

Since its establishment, every eastern event of sectional or national significance in commercial aviation has sought the safety, the accessibility, the complete service and equipment of Central Airport. All the eastern divisions of the National Air Races started from here late in August. The official dedication, this past week, was attended by the foremost figures in aviation in America. The mighty armada of the National Air Tour, contesting for the Edsel B. Ford Trophy, will come to rest at Central Airport early in October.

Central Airport is the focal point for aviation in the Philadelphia-Camden area, with its three million people, its thousands of factories, its industries devoted to the production of metals, woods, textile finishes, equipment, instruments and parts for the aviation industry.

Every form of airplane and engine service is established at Central Airport, organized to serve both the private flier and the transport organization desiring the enormous mail, express and passenger loads originating in this vast community. Land adjoining the field is available to the aircraft manufacturer; storage, display and office space, to the airplane and engine distributor. A great aviation center has been built at Central Airport. And the aviation industry is rapidly making it greater. Detailed information will be furnished any one requesting it. Central Airport, Inc., Fidelity-Philadelphia Building, Philadelphia, Pa.

PHILADELPHIA-CAMDEN

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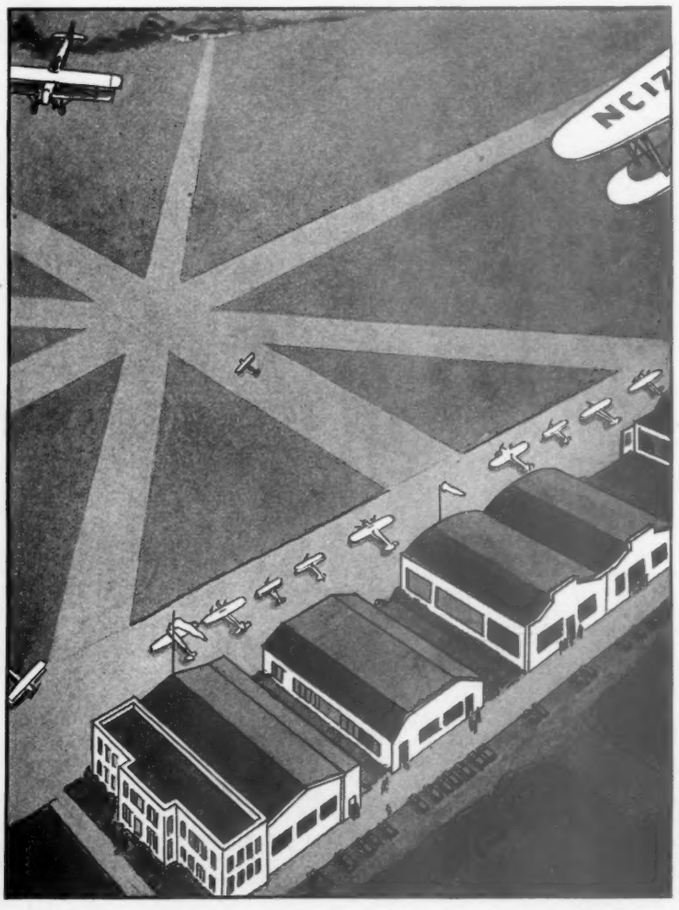
✓FIRE SAFETY
✓ECONOMY
✓SPEEDY CONSTRUCTION
✓PERMANENCE



✓LOW MAINTENANCE
✓LOW DEPRECIATION
✓DECREASED HEAT LOSSES

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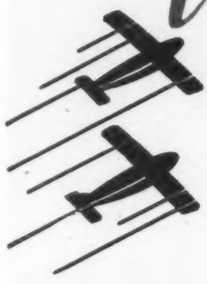

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NATCO FLOOR TILE
Laid on cinder fill, with concrete topping. Gives exceptionally serviceable floor.

NATCO TEX-TILE
For exterior walls. Beautiful textured face. Inside scored for plaster.

NATCO HEADER BACKER
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NATCO DOUBLE SHELL LOAD BEARING TILE
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NATCO GLAZED COMBED FACE
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Natco Structural Clay Tile are molded from special clay and burned in great kilns, at a temperature of over 2000 degrees, to the density and strength of rock. Absolutely non-inflammable, they help confine a fire and afterwards permit a maximum of salvage.

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The various types of Natco Tile provide a size and style for every building need. Each tile is equivalent in volume to several brick. Natco airport structures go up with gratifying speed, are quickly ready for use.

✓PERMANENCE
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✓LOW DEPRECIATION
Natco Structural Clay Tile may be truly called "Blood Brother to the Everlasting Rocks." Buildings built of it are highly resistive to all the agencies of destruction and decay. Depreciation is usually figured at ½% a year—almost negligible.

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to be built of_____
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Aeronautics Department

GOODYEAR, AKRON, OHIO
OR LOS ANGELES, CALIFORNIA

EVERYTHING IN RUBBER FOR THE AIRPLANE

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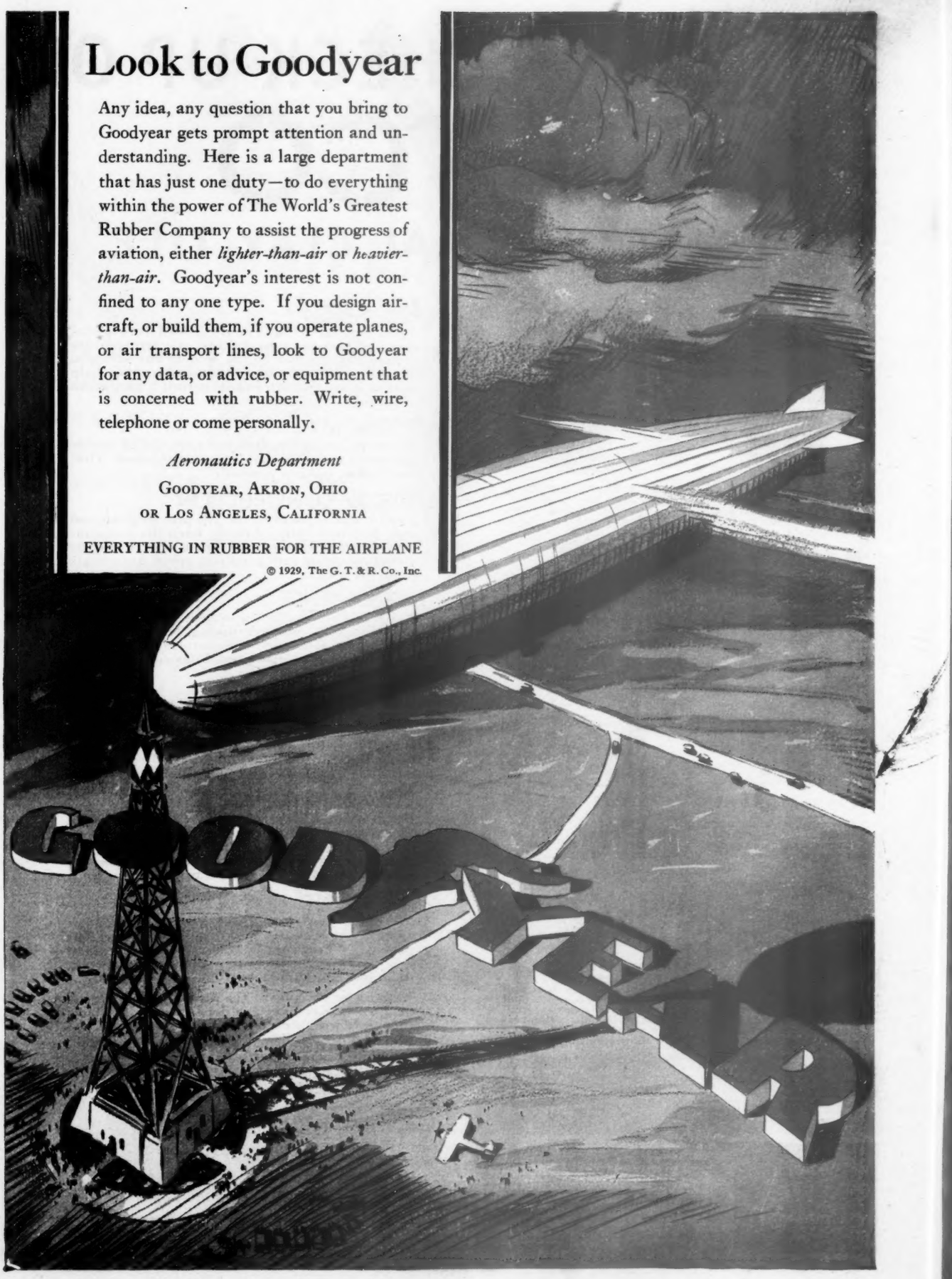

DISTINGUISHED FROM ALL OTHERS BY PERFORMANCE

On the take-off . . . in the air . . . slipping into the small field . . . no matter what the task or condition may be, Spartan is distinguished from all others by performance.

The new Spartan C-3-165 comes from a background of years filled with scientific research, of experiment involving rebuilding, testing and re-designing. The result is an airplane designed and built to give faithful, uninterrupted service, amply powered by the Wright "Whirlwind Five" and scientifically correct from the standpoint of modern, progressive engineering. In no other airplane is craftsmanship more apparent than in the new Spartan. A rigid manufacturing policy which places quality before quantity insures final perfection of every detail. Inherent stability is a characteristic upon which Spartan owners may rely for accurate, unfaltering flight under any condition. And, finally, back of Spartan is the security of an organization possessing both the purpose and resources to remain in the foreground of American airplane manufacturers.

Progressive airplane dealers will recognize in Spartan outstanding characteristics which appeal to the prospective buyer . . . and in the Spartan sales franchise an opportunity for a sound business connection.

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AND DESCRIPTIVE LITERATURE**

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TULSA · OKLAHOMA

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THERE'S one thing that rates high when you're in the air . . . dependability. It's been said over and over again but it means more and more each day as aviation marches forward to greater importance in transportation. That's the basic reason underlying the universal acceptance of SKF . . . the highest priced bearing in the world . . . by the industry.

Long a leader in the field, Pratt & Whitney has been a consistent user of SKF Bearings for its motors. On the "Wasp" they are to be found providing the maximum protection for crankshaft, propeller, supercharger, rocker arms and generator drive. Precision, ruggedness, long-life and no adjustment . . . these are outstanding features of SKF which have materially contributed to the success of the "Wasp" in its many achievements.

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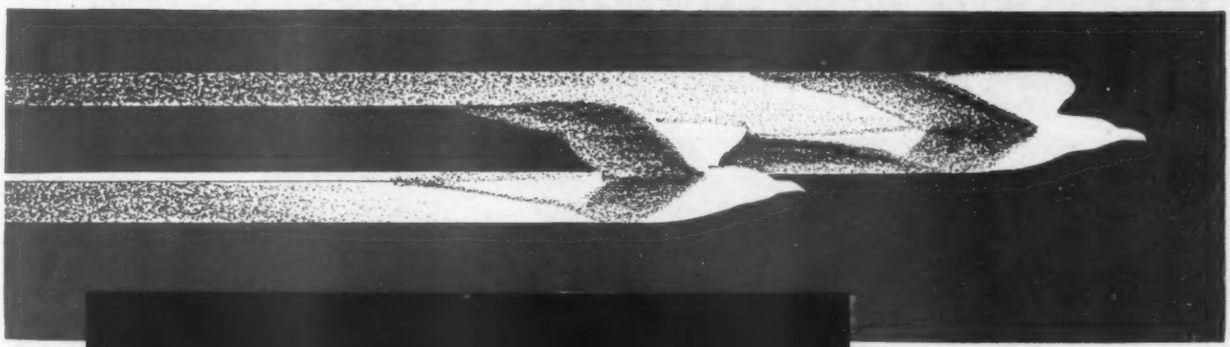

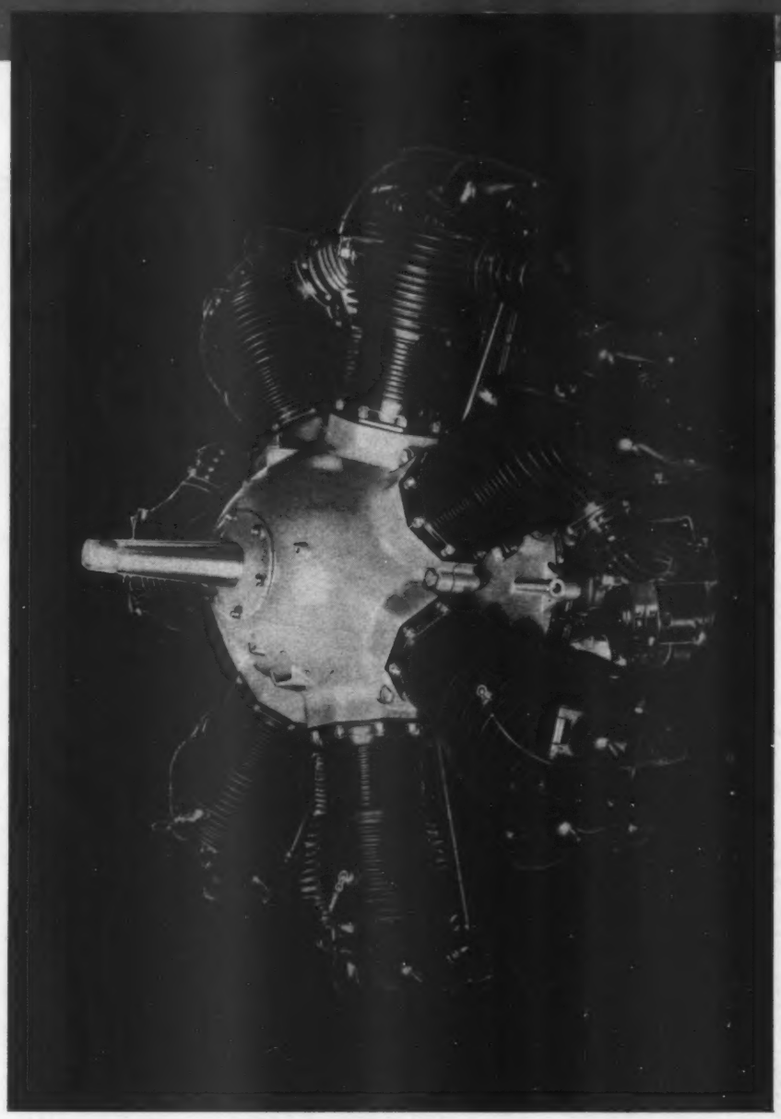

Clean-cut — compact — symmetrically balanced, the Type B Axelson Airplane Engine offers a pleasing appearance. The front is devoid of obstructive fittings or anything that might tend to interfere with the air flow. The new Axelson Catalog describing Type B Engine may be had for the asking.

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(P. O. Box 337)

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***First and Second*—Combined Speed and Load Race for Light Planes, National Air Races 1929.**

***American Altitude Record* for Light Planes—20,862 feet.**

***World Non-Stop Distance Record* for Light Planes—1650 miles—16 hours—103 miles per hour.**

***Second*—All Ohio Derby—National Air Races 1929.**

***Second*—Free for All Light Plane Speed Race, National Air Races 1929.**

THE BARLING NB3—the only approved 3-place, all-metal structured, low wing monoplane—placed first or second in every event entered at the 1929 National Air Races.

Equipped with LeBlond 60 H. P. Engine, $3,600 Factory
Equipped with Velie 65 H. P. Engine . . $3,600 Factory
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Our new Sales Plan is in effect. Factory branches are established—our quick-delivery problem is solved. Direct factory assistance to dealers is an exclusive feature! Write for our profitable Dealer Plan.

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BARLING NB3 Monoplane

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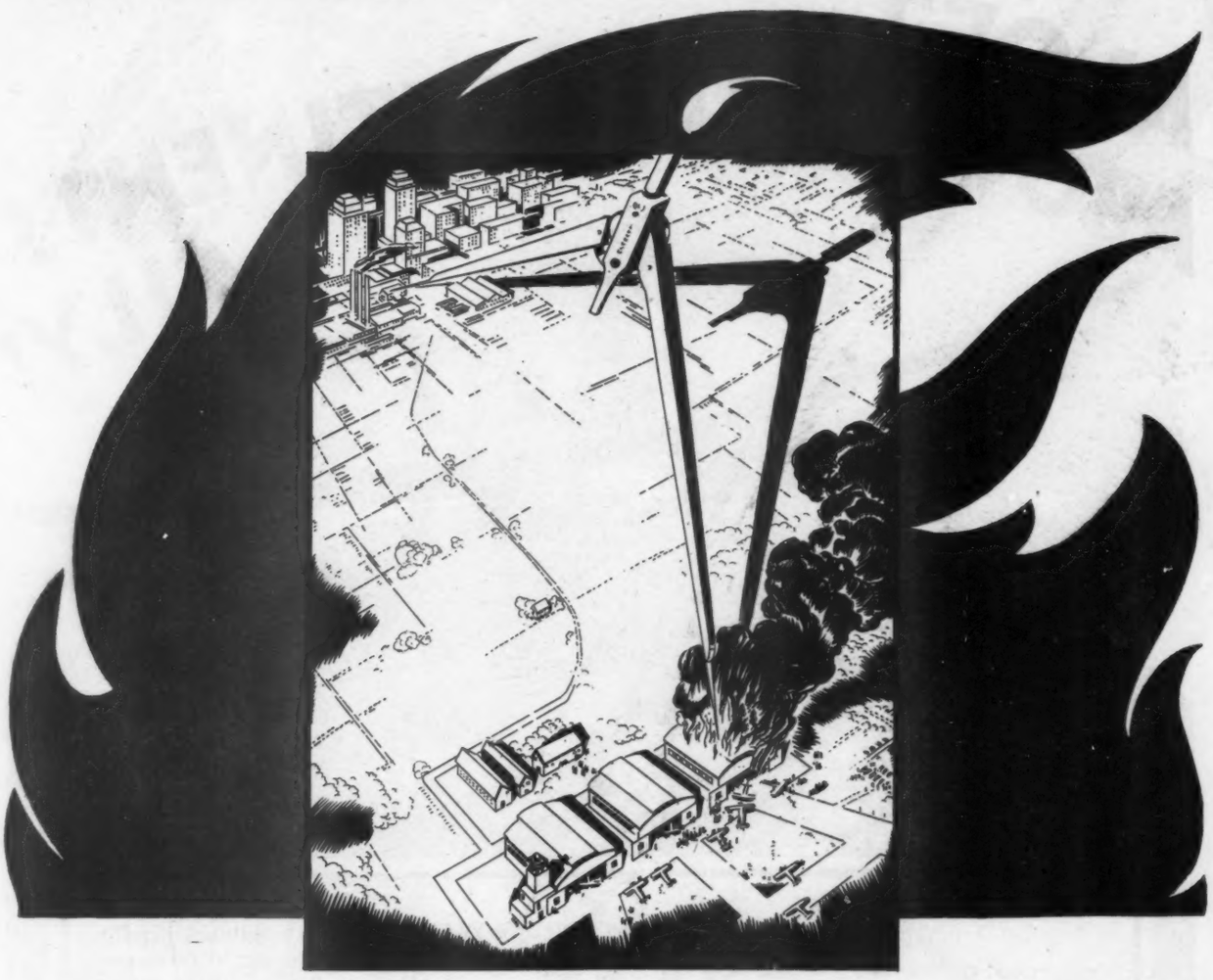

How far is your airport from the nearest Fire Station?

Airports need ground space. Yet space is so precious that most cities can't afford airports within their bounds. What arrangements have you made to protect your airport against fire—when the nearest city station is blocks or miles away? Where couldn't fire spread—with such helpers as gasoline and oil and other extra hazardous materials—before the fire department arrived? How about water supplies when the apparatus *does* arrive?

There's only one answer! Your best and often *only* safeguard against fire's invasion is "first-aid" fire extinguishing equipment—a *vital* necessity to any airport!

Protecting your airport against fire is not just a question of buying one—or ten—or twenty extinguishers. There are 4 basic essentials that must be followed for correct protection—essentials which American-LaFrance and Foamite Engineers will gladly explain to you and help you put into effect. Every airport represents a different problem and since this company makes all recognized types of extinguishers, its recommendation to you can be accepted as authoritative and final.

Over 150 airports are already safeguarded by American-LaFrance and Foamite protection. Ask one of our engineers to discuss with you the fire protection of your airport. Such an interview obligates you in no way. The booklet "Sinister Beacons" describes the fire hazards of airports and the equipment which American-LaFrance and Foamite offers for fire protection. It's yours for the asking. Use the coupon. American-LaFrance and Foamite Corp., Engineers and Manufacturers, Dept. T53, Elmira, N.Y.

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☐ Please send me your booklet "Sinister Beacons."

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A Complete Engineering Service

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3-place
Baby Amphibian

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TWELVE YEARS' successful building...literally millions of miles of safe commercial transport flying...Savoia-Marchetti flying boats and amphibians as produced today are aviation's most striking example of "the survival of the fittest".

Daily passenger and mail services using the Savoia-Marchetti 14-passenger type S-55 are now linking important centers of Europe, North Africa and Asia.

Now American cities, located on waterways, are also taking advantage of their natural landing facilities, with Savoia-Marchetti ships, for these famous flying boats and amphibians are being produced in the United States, in 3 types, for transport, mail, aerial service and private flying.

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This record of long-continued service in Air Mail planes surely demonstrates the *dependability* of PEDRICKS to an extent that no *single flight*, however famed, could prove. PEDRICKS hold compression and prevent oil pumping [spark plug fouling]—and continue to do so indefinitely.

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Philadelphia

Again, MOTH Victories Sweep Two Continents!

At the Cleveland Air Races, in three derbies and five closed course events, Gipsy Moths won:

Four 1st places
Two 2d places
Two 3d places
One 4th place
Two 5th places

... And though the first American-built Moth was produced only last April, yet there were more Moths at the Cleveland Air Races than any other single commercial type of aircraft.

Only standard Moth planes with NC numbers participated in these events, competing against a field of practically all special planes with NR numbers, licensed for racing only. This brilliant performance not duplicated by any other light airplane was an outstanding feature of the Cleveland Races.

MOTH Wins Stunting Championship of the World!

A Gipsy Moth recently won the international aerobatic contest, against the leading high-powered planes of the world, at the International Aero Exhibition, held near London—convincing proof that Moth performance, sturdy strength, and responsive controls are equal to the severest demands of stunt flying.

King's Cup Air Race another MOTH Triumph!

Moth again scored a sweeping victory at the King's Cup Race, 1169 miles around England. The final positions of the 15 finishing planes tells graphically the story of Moth performance and reliability.

Final Position	*Make of Plane*	*Engine H. P.*	*Miles per Hour*	*Final Position*	*Make of Plane*	*Engine H. P.*	*Miles per Hour*
1	Grebe	400	147.73	9	MOTH	100	100.84
2	MOTH	90	100.23	10	MOTH	100	100.81
3	MOTH	100	116.79	11	MOTH Coupe	100	99.52
4	MOTH	100	118.76	12	Avian	85	97.52
5	MOTH	100	105.12	13	Widgeon	85	97.47
6	Avian	110	111.18	14	MOTH Coupe	100	97.47
7	Grebe	400	142.26	15	Widgeon	85	90.90
8	Avian	90	99.66				

International Victory! In the International Light Plane Tour around Europe, just completed, a Gipsy Moth made the fastest time of all entries, and, in spite of its large handicap, came in second under the rules.

MOTH AIRCRAFT CORPORATION, Lowell, Mass.

Demonstrations and full information may be obtained from Moth Distributors, or from 36 offices of Curtiss Flying Service, Inc. Address of nearest distributor will be mailed on request.

AVIATION

The Oldest American Aeronautical Magazine

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JAMES H. McGRAW, JR., *Publishing Director*

R. SIDNEY BOWEN, JR., *Associate Editor*

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JOHN T. NEVILL, *Detroit Editor*

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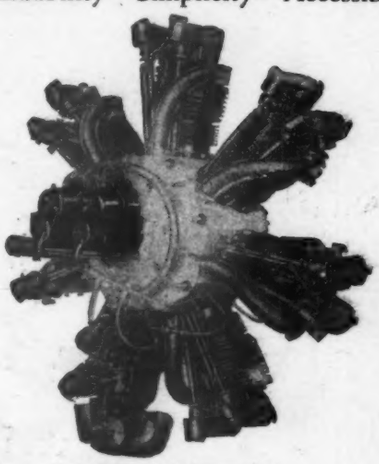

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AVIATION

THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

A McGRAW-HILL PUBLICATION . . . ESTABLISHED 1916

EDWARD P. WARNER, *Editor*

VOLUME 27 . . . *October 5, 1929* . . . NUMBER 14

Introduction

THE TIME HAS PASSED when any man can carry in mind all of the pertinent information upon aeronautical development. The accumulated experience demands continuous classification and interpretation if it is to be of use. Both the figures and their interpretation must be brought up to date at intervals of only a few months, or they lose all but historical interest. Only a periodical can keep pace with the flux of the industry and of the aircraft operation. We have undertaken in the present issue to present a selection of the most important data.

Statistics do not make lively reading, but for the reader with imagination they need little interpretative comment to tell a romantic story. The whole essential record of the performance of the airmail is written in three or four lines that waver across the page, with a sharp twist upward beginning in 1927. Another chart, and the tables that accompany it, tell the tale of growing military and naval confidence in aeronautics and growing dependence upon aviation in the armed services, and of the desperate struggle to find and to keep in the services properly qualified flying personnel in adequate numbers. Records of the aeronautical appropriations of foreign countries interpret in terms of their mutual alarms and their changing economic conditions. Tables and charts such as those here presented are the foundations upon which the plans of business are laid.

Not until the attempt is made to compile such material is it realized what a diversity of conflicting information exists. Even upon operations within the United States there sometimes appear two distinctly different sets of data, both from apparently authentic sources and apparently representing the same thing. When foreign performances are to be analyzed, the conflict becomes appalling. The figures here given have in many cases been based upon a sifting of several sources and a rejection of all but one. In a few instances, where two or more apparently equally reliable sets of statistics differ from each other, but only by relatively little, their average has been used.

Most of these figures have naturally been drawn from official sources. To those who have given freely of assistance in securing and arranging data, and especially to the officials of the Aeronautics Branch of the Department of Commerce and to those of the Aeronautical Chamber of Commerce, we are glad to express our indebtedness. Other government departments have also helped in varying degrees, and the publications of foreign governments have been called upon extensively. Among the published volumes found especially useful, either as original sources of material or for checking each other and against official reports, special mention should be made of the yearbooks of the Aeronautical Chamber of Commerce, "The Air Annual of the British Empire," the several volumes of "L'Année Aéronautique," compiled by Hirschauer and Dollfus, and "Die Jahrbuch für Luftverkehr." Among official foreign documents the annual reports on the progress of civil aviation prepared by the British Air Ministry has been particularly helpful.

ALTHOUGH EVERY EFFORT has been made to attain accuracy, it is not to be expected, particularly in view of that conflict of testimony previously mentioned, that perfection would be reached or very nearly approached. We shall be grateful for information of any errors, and glad to correct in an early issue any that may be of a substantial nature or seriously misleading. Authenticity obviously cannot be guaranteed, especially in the first publication of the kind and where so much historical material is contained.

This is the first statistical number of AVIATION, but it will not be the last. Suggestions for modifications in content, or for interesting and valuable additions to the list of material now presented, will be gratefully received.

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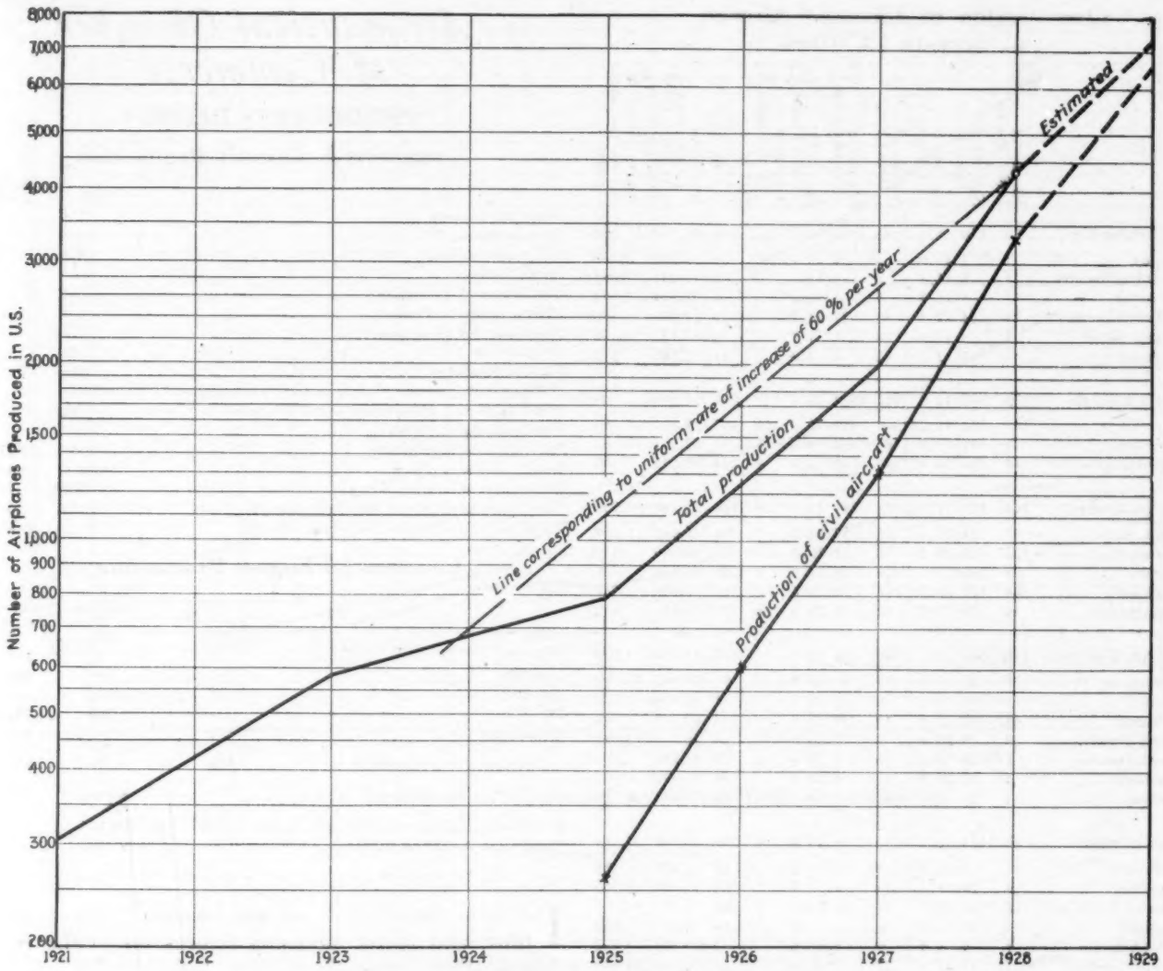
Production AND *License Data*

Classification of Licensed and Identified Aircraft as of March 30, 1929

Grouped by seating capacity. Source: Aeronautical Chamber of Commerce analysis. War surplus planes were excluded from the listing.

	Closed Cabin Land Planes — No. of seats											Open Cockpit Land Planes — No. of seats				Seaplanes and Amphibions — No. of seats			
	1	2	3	4	5	6	7–8	9–10	11–12	13 and Over	Total	1	2	3 and Over	Total	4–5	6–7	8 and Over	Total
NEW ENGLAND																			
New Hampshire	..	...	..	..	...	..	..	..	..	..	...	...	...	10	10	..	..	..	..
Maine	..	...	..	..	...	1	..	..	..	..	1	...	...	10	10	..	..	..	..
Vermont	..	...	..	..	...	..	..	..	..	..	...	...	...	4	4	..	..	..	..
Massachusetts	..	1	..	..	10	..	1	..	..	..	12	1	2	81	84	..	1	..	1
Rhode Island	..	...	..	..	...	..	..	..	..	..	...	...	1	14	15	..	..	..	..
Connecticut	..	3	..	..	2	..	..	..	..	..	5	1	1	41	43	..	..	..	..
MIDDLE ATLANTIC																			
New York	..	5	12	7	43	9	4	6	1	17	104	29	32	271	332	11	14	16	41
New Jersey	..	5	..	..	2	..	1	..	..	..	8	2	2	68	72	1	4	..	5
Pennsylvania	..	11	2	3	17	..	..	..	..	..	33	23	4	194	221	2	..	..	2
EAST NORTH CENTRAL																			
Ohio	..	9	3	4	13	12	..	..	..	2	43	8	6	172	186	..	..	..	..
Indiana	..	6	..	..	2	2	..	..	..	..	10	3	4	72	79	2	..	..	2
Illinois	..	29	5	3	10	10	5	..	..	4	66	29	7	219	255	2	5	..	7
Michigan	..	5	5	4	5	12	4	1	..	12	48	5	5	159	169	..	..	..	..
Wisconsin	..	6	..	1	8	1	4	..	..	1	21	...	1	97	98	2	..	..	2
WEST NORTH CENTRAL																			
Minnesota	..	2	4	2	5	4	1	..	..	5	23	2	15	78	95	..	1	..	1
Iowa	..	2	1	2	6	1	..	..	..	..	12	...	1	58	59	1	1	..	2
Missouri	..	5	7	3	11	3	..	..	..	4	33	...	8	158	166	..	..	..	..
North Dakota	..	2	..	..	3	..	..	..	..	..	5	...	...	16	16	..	..	..	..
South Dakota	..	5	..	1	2	..	..	..	..	1	9	...	...	27	27	..	..	..	..
Nebraska	..	2	..	3	2	2	..	..	..	..	9	...	23	48	71	..	..	..	..
Kansas	..	3	15	1	...	..	..	..	..	..	19	...	5	90	95	..	..	..	..
SOUTH ATLANTIC																			
Delaware	..	...	..	..	...	8	..	..	..	..	8	1	...	3	4	..	..	..	..
Maryland	..	4	..	..	1	..	..	..	..	..	5	1	1	19	21	..	..	..	..
District of Columbia	..	...	..	..	9	..	..	..	..	1	11	6	1	30	37	2	1	..	3
Virginia	..	...	..	..	...	..	..	..	..	..	0	...	1	41	42	..	1	..	1
West Virginia	..	...	..	..	...	..	..	..	..	1	2	...	...	13	13	..	..	..	..
North Carolina	..	7	1	..	...	..	..	..	..	..	8	2	...	52	54	..	..	..	..
South Carolina	..	...	..	1	...	..	..	..	..	..	1	...	...	17	17	..	..	..	..
Georgia	..	...	..	..	1	..	..	..	..	..	1	1	...	36	36	..	..	..	..
Florida	..	1	1	..	...	..	..	..	..	..	3	4	2	41	47	3	..	..	3
EAST SOUTH CENTRAL																			
Kentucky	..	2	1	..	2	..	..	..	..	..	5	1	1	26	28	..	..	..	..
Tennessee	..	2	1	..	2	2	1	..	..	..	8	...	...	35	35	..	..	..	..
Alabama	..	1	..	..	...	..	..	..	..	..	1	...	1	10	11	..	..	..	..
Mississippi	..	...	..	..	...	..	..	..	..	..	0	...	...	19	19	..	..	..	..
WEST SOUTH CENTRAL																			
Arkansas	..	...	1	..	...	..	..	..	..	..	1	...	...	36	36	..	..	..	..
Louisiana	..	2	..	..	2	1	..	..	..	..	5	1	2	31	34	..	5	..	5
Oklahoma	..	6	4	1	9	11	1	..	..	1	33	1	2	109	112	..	..	..	..
Texas	..	10	3	4	16	4	..	1	..	..	38	10	4	117	131	..	..	..	..
MOUNTAIN																			
Montana	..	3	..	..	2	1	..	..	..	..	6	...	...	39	39	..	..	..	..
Idaho	..	...	..	..	1	..	..	..	..	..	1	...	2	8	10	..	..	..	..
Wyoming	..	1	..	..	...	..	..	..	..	..	1	...	1	12	13	..	..	..	..
Colorado	..	...	..	..	2	..	..	..	..	..	2	...	1	22	23	..	1	1	2
New Mexico	..	1	..	..	1	..	..	..	..	..	2	...	1	3	4	..	..	..	..
Arizona	..	...	..	..	2	..	..	..	..	2	4	1	2	12	15	1	..	1	2
Utah	..	...	..	1	1	..	..	..	..	..	2	2	1	10	13	1	3	..	4
Nevada	..	...	..	..	1	..	..	..	..	..	1	1	4	.....	5	..	..	..	..
PACIFIC																			
Washington	..	4	11	..	21	1	..	..	3	..	40	14	5	60	79	2	..	..	2
Oregon	..	3	..	..	2	..	..	..	..	..	5	1	2	38	41	..	..	..	..
California	1	35	8	3	50	4	2	5	3	19	130	34	73	421	528	..	10	..	10
ALASKA	..	...	..	..	1	..	1	..	..	..	2	...	...	6	6	..	..	..	..
TOTAL	1	183	85	44	267	84	33	12	7	70	787	184	224	3,152	3,560	30	47	18	95



American Airplane Production, 1921-1929

ONLY SINCE 1925 have annual figures been available on production. Prior to that time a biennial census of manufactures was the only resource. All of the figures in the above chart were drawn from the Bureau of the Census or from the Aeronautics Branch of the Department of Commerce.

The rate of increase of production has been remarkably steady over the past four years, with an average rate of increase for non-military aircraft alone of 130 per cent per annum. In no year has the increase over the previous year been less than 115 per cent or more than 155. For the present year, gauging roughly from the Chamber of Commerce production survey of the first six months, the increase over 1928 for civil aircraft seems likely to fall back to about 80 or 90 per cent. Obviously no industry can continue to more than double its output each year for very long, and the production curve plotted on a logarithmic scale, such as is here used, inevitably begins to flatten out in the comparatively early stages of an industry's history.

Judging by number of planes military production is fading toward insignificance, although it still remains a substantial proportion of the total value. In 1925 nearly 70 per cent of the planes were military. In 1927 the proportion had decreased to about a third, and in 1928 to less than a quarter.

The table on the opposite page is made up of the latest complete count available from the Aeronautical Chamber of Commerce, and is the only one which includes identified as well as licensed machines.

Periodic Airplane License and Identification Data

Quarterly Date	Licenses Valid	Identifications Valid	Total New Licenses and Identification	Ratio of Licenses to Total	New Licenses Applied for in Preceding 3 Months	New Identifications Applied for in Preceding 3 Months
Mar. 31, 1928	1,136	1,011	2,147	.528	703	355
June 30, 1928	1,564	1,320	2,884	.542	1,008	430
Sept. 30, 1928	1,980	1,819	3,799	.522	1,245	768
Dec. 31, 1928	3,165	1,939	5,104	.620	821	644
Mar. 31, 1929	3,702	2,462	6,164	.600	883	887
June 30, 1929	4,546	2,885	7,431	.612	1,791	1,119
Aug. 31, 1929	5,271	3,062	8,333	.633	1,573[1]	637[1]

[1] Two months only.

Classification of Licensed Aircraft as of July 15, 1929

States	Number of Monoplanes	Number of Biplanes	Per Cent of Monoplanes	Number of Open Cockpit	Number of Closed Cabin	Per Cent of Cabin Planes	Number of Multi-engined	TOTAL LICENSED AIRCRAFT	Number of Inhabitants per Airplane, (1920 Census)	Square Miles of Area per Airplane
New England	30	150	16.6	148	32	17.2	..	150	41,117	369
Maine	1	3	25.0	3	1	25.0	..	4	192,004	8,260
New Hampshire	1	8	11.1	8	1	11.1	..	9	49,232	1,038
Vermont	1	5	16.7	5	1	16.7	..	6	58,738	1,594
Massachusetts	25	84	22.9	82	27	24.8	..	109	35,343	76
Rhode Island	1	8	11.1	8	1	11.1	..	9	67,142	138
Connecticut	1	42	2.3	42	1	2.3	..	43	32,108	116
Middle Atlantic	353	682	34.0	671	364	35.1	59	1,094	20,349	94
New York	302	386	43.2	384	314	45.0	55	753	13,803	68
New Jersey	11	83	11.7	84	10	9.4	3	97	32,535	85
Pennsylvania	40	203	16.4	203	40	16.4	1	244	35,739	185
East No. Central	214	727	23.8	708	233	24.7	29	970	22,140	259
Ohio	53	174	23.3	173	54	23.8	3	230	25,041	174
Indiana	25	58	30.0	58	25	30.0	1	84	34,886	433
Illinois	63	230	21.5	220	73	24.9	7	300	21,618	189
Michigan	43	175	19.7	167	51	23.4	17	235	15,600	247
Wisconsin	30	90	25.0	90	50	25.0	1	121	21,753	632
West No. Central	116	360	24.3	360	116	24.3	23	499	25,138	1,039
Minnesota	30	51	37.0	50	31	38.8	11	92	25,947	920
Iowa	11	40	21.3	40	11	21.3	..	51	47,138	1,101
Missouri	40	142	22.0	143	39	21.4	11	193	17,638	360
North Dakota	5	9	28.0	9	5	28.0	..	14	46,205	5,081
South Dakota	7	20	38.6	20	7	38.6	1	28	22,734	2,772
Nebraska	8	32	20.0	32	8	20.0	..	40	32,408	1,932
Kansas	15	66	18.5	66	15	18.5	..	81	21,843	1,014
South Atlantic	43	193	18.2	191	45	19.0	3	239	47,748	1,184
Delaware	11	5	67.8	4	12	75.0	..	16	13,938	148
Maryland	6	26	18.8	26	6	18.8	..	32	45,302	385
Dist. of Columbia	12	46	20.7	44	14	24.2	2	60	7,293	1
Virginia	1	25	4.0	26	..	.0	..	26	88,815	1,639
West Virginia	1	6	16.6	6	1	16.6	..	7	209,100	3,452
North Carolina	7	22	41.4	22	7	41.4	..	29	88,246	1,805
South Carolina	..	13	.0	13	..	.0	..	13	129,518	2,383
Georgia	1	18	5.3	18	1	5.3	1	20	144,792	2,963
Florida	4	32	11.1	32	4	11.1	..	36	27,902	627
East So. Central	19	65	22.6	64	20	23.8	..	84	105,874	217
Kentucky	4	14	45.0	14	4	45.0	..	18	134,257	2,256
Tennessee	13	20	39.4	19	14	42.5	..	33	70,845	1,273
Alabama	2	13	13.3	13	2	13.3	..	15	156,545	3,467
Mississippi	..	18	.0	18	..	.0	..	18	99,478	2,604
West So. Central	103	259	28.4	255	107	29.2	13	375	27,313	1,194
Arkansas	1	23	4.2	23	1	4.2	..	24	73,008	2,223
Louisiana	6	36	14.6	35	7	16.6	2	44	40,875	1,103
Oklahoma	29	97	21.2	94	32	25.4	8	134	15,136	523
Texas	67	103	41.2	103	67	41.2	3	173	26,966	1,537
Mountain	20	95	17.3	95	20	17.3	6	121	27,572	7,149
Montana	3	16	15.8	15	4	21.1	..	19	28,888	7,737
Idaho	4	10	40.0	11	3	21.4	..	14	30,847	5,992
Wyoming	1	9	10.0	9	1	10.0	..	10	19,440	9,791
Colorado	4	32	12.5	32	4	12.5	1	37	25,395	2,810
New Mexico	1	2	33.3	2	1	33.3	..	3	120,117	40,878
Arizona	3	10	23.0	10	3	23.0	2	15	22,227	7,597
Utah	4	14	23.0	14	4	23.2	3	21	21,399	4,047
Nevada	..	2	.0	2	..	..	..	2	38,703	55,345
Pacific	104	514	16.8	479	139	22.1	45	663	8,396	489
Washington	12	..	13.7	..	40	40.4	9	108	12,561	640
Oregon	4	..	12.5	..	4	12.5	..	36	21,733	2,686
California	88	..	18.2	..	95	19.6	36	519	6,603	305
Total for U. S.	1,002	3,045	24.7	2,971	1,076	26.5	178	4,225	25,021	717
Territories	1	6	14.2	6	1	14.2	..	7	7,862	84,412
Alaska	1	6	14.2	6	1	14.2	..	7	7,862	84,412
Grand total	1,003	3,051	24.7	2,977	1,077	26.5	178	4,232	24,992	855

Aeronautical Chamber of Commerce

PRODUCTION REPORT

Commercial Aircraft Production

	1928	Jan.-June, 1929
Open monoplanes	171	144
Open biplanes	2,348	1,623
Cabin monoplanes	850	884
Cabin biplanes	69	17
Multimotored monoplanes	58	115
Multimotored biplanes	5	0
Seaplanes and flying boats	11	18
Amphibions	30	53
Total monoplanes	1,079	1,143
Total biplanes	2,422	1,640
Total seaplanes, flying boats and amphibions	41	71
Total number of planes	3,542	2,854
Total value of monoplanes	$8,738,683	$9,829,845
Total value of biplanes	7,541,615	5,421,902
Total value of seaplanes and amphibians	914,000	1,781,000
Total value of all types (commercial production)	17,194,298	17,032,747
Total value of all types (including military)	.....	23,685,572

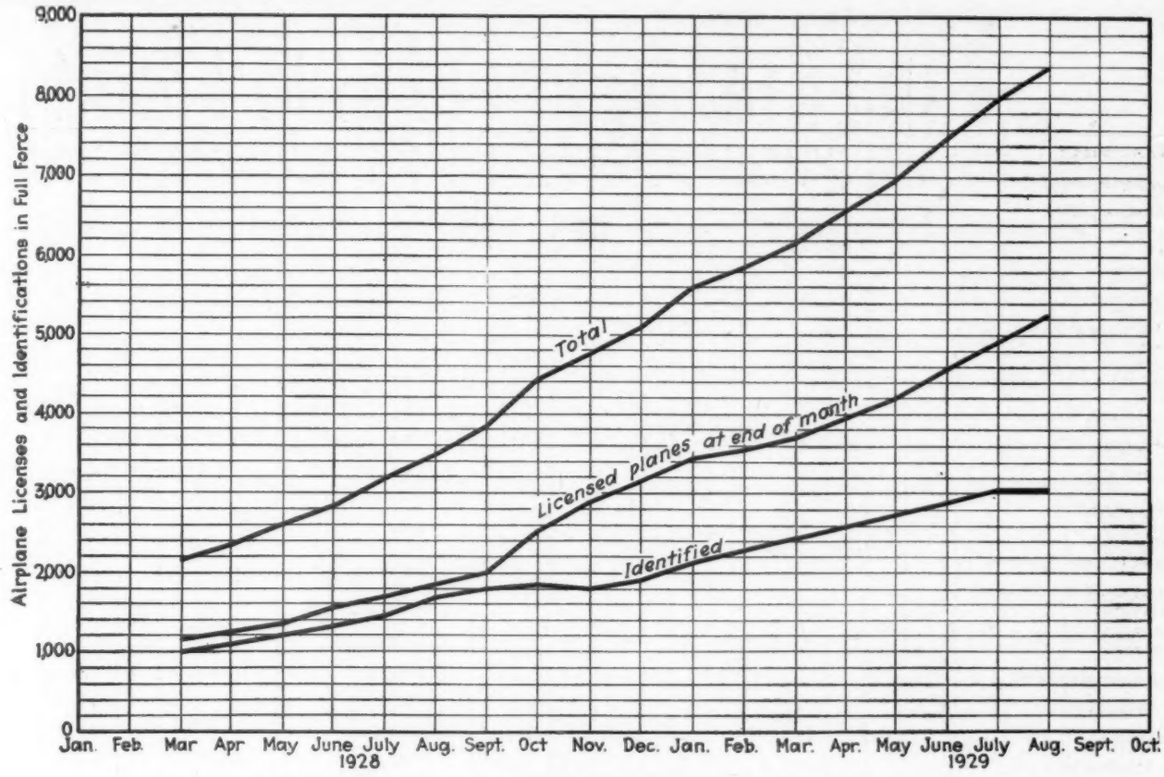
Commercial Engine Production

Hp.	Number Reported 1928	Number Reported Jan.-June, 1929	Total Value Jan.-June, 1929
0– 50	32	43	$33,540
50–100	237	509	482,500
100–200	182	1,001	2,141,750
200–300	924	480	1,391,800
300 and up	475	1,242	6,883,784
Total number reported	1,850	3,275	$10,923,374

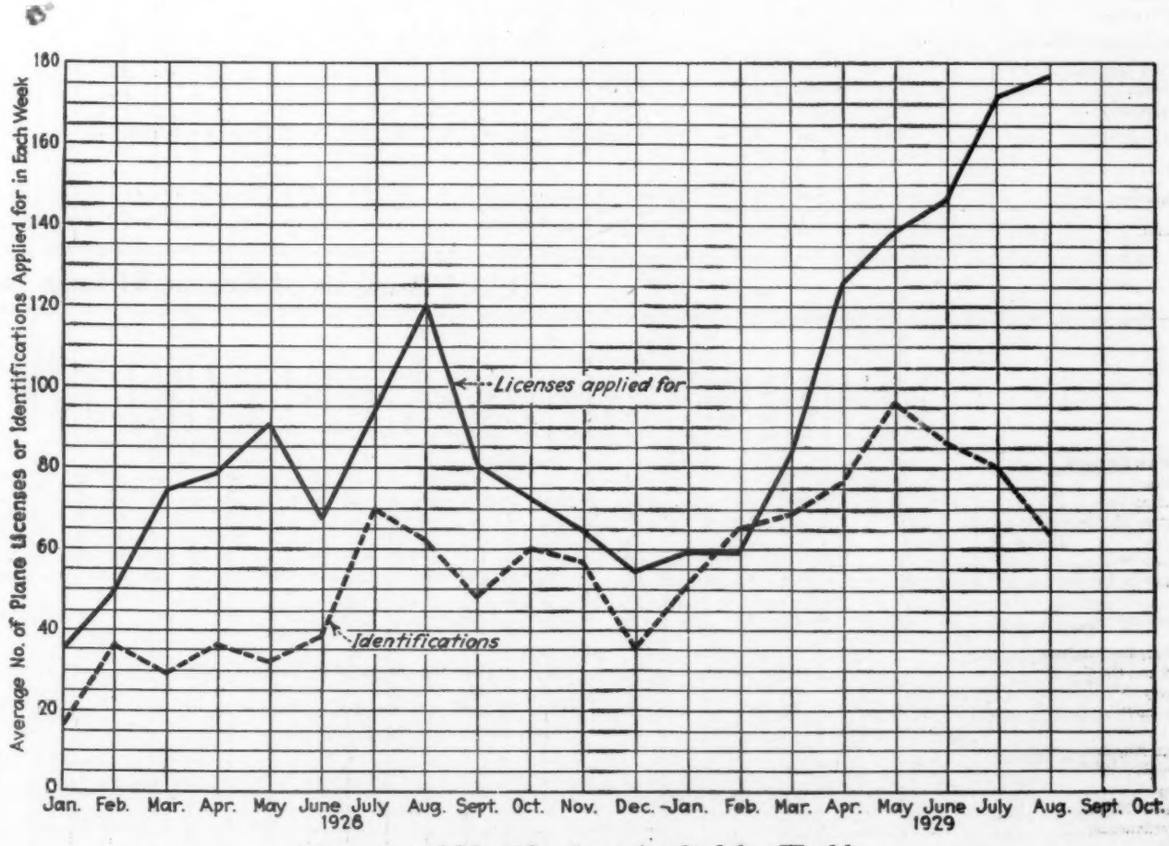
	1928	Jan.-June, 1929	
Total value commercial production	$8,936,725	$10,923,374	.....
Total vaue, including military	.....	14,349,375	.....

IN THE PRODUCTION REPORT which carries through June, and in the licensing figures up to the end of August, there is not the slightest indication of any check on airplane production. Although the total of licenses and identifications applied for fell off slightly in August, that is a natural seasonal reaction. It remains to be seen whether or not it will be followed by such an abrupt decrease as took place in September, 1928. It is a curious fact that the total of applications for licenses and identifications decreased somewhat in June in both years, and then went strongly ahead in July. Roughly speaking, the maximum rate of application for the present year has been forty per cent higher than in 1928.

The production report compiled by the Aeronautical Chamber of Commerce shows an aggregate business on airplanes and engines of $38,035,000 for the first six months of 1929 as against approximately $48,000,000 for all production, including military, for the entire year of 1928. Particularly striking facts apparent from the figures are the increasing vogue of the cabin monoplane and of the seaplane and amphibion, and the increasing use of high-powered engines. In 1928 half the commercial engine production was in a single power class, and almost all of that was of a single make. For the present year engines of over 300 hp. have increased from 26 per cent to 38 per cent of the total number produced. The aggregate production of engines is at present slightly in excess of that of airplanes, although not even now is it large enough to allow for necessary spare and replacement power plants and for the extras for multi-engined machines. In 1928 the war-time engine was still dominant, and the number of new engines produced was only 52 per cent of the number of planes.



Total Numbers of Licensed and Identified Airplanes



Licenses and Identifications Applied for Weekly

Analysis of Airplane License Data by

	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	Dist. of Col.	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana	Nebraska
Alexander Aircraft Co.	....	3	3	71	23	1	....	2	3	2	3	16	10	2	7	....	1	....	2	9	19	9	6	24	4	4
American Eagle Aircraft Corp.	5	....	2	13	1	1	....	....	2	1	....	10	1	7	8	1	....	....	....	8	10	8	....	15	....	....
Boeing Airplane Co.																										
Boeing 40	....	....	....	2	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Boeing 95	....	....	....	4	....	....	....	....	....	....	....	7	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Miscellaneous	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Command-Aire, Inc.	....	....	6	5	....	....	....	3	3	....	....	4	....	....	....	....	4	....	4	3	3	2	4	5	1	....
Curtiss Aeroplane & Motor Co.																										
Curtiss Falcon	....	....	....	....	....	....	....	....	....	....	....	8	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Curtiss Fledgling	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	5	....	....	....	....	....
Miscellaneous	....	....	....	....	....	1	....	....	1	....	....	4	....	....	....	....	4	....	1	2	....	....	....	....	....	....
Curtiss-Robertson Co.	....	....	1	6	....	....	....	....	2	....	....	9	11	2	....	1	....	....	....	8	7	10	....	15	....	1
Fairchild Airplane Mfg. Co.	....	1	....	6	....	1	....	3	....	....	....	9	2	3	1	1	....	....	2	4	1	3	....	5	....	....
Fleet Aircraft Co.	....	3	1	4	....	1	....	2	....	....	....	7	3	1	....	....	....	....	....	....	2	....	....	22	....	....
Fokker Aircraft Co.																										
Wasp powered	....	....	....	13	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	7	....	....
Wright powered	....	....	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Universal & Super Universal	....	....	....	5	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	6	....	1	....	....
Ford Motor Co. (Stout Division)																										
Wasp powered	....	....	....	5	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	3	3	....	1	....	....
Wright powered	....	2	....	7	....	....	....	1	....	....	....	3	....	....	....	....	....	....	....	....	10	1	....	2	....	....
Miscellaneous	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Kreider Reisner Aircraft Co.	....	....	....	1	....	12	....	....	....	1	....	2	....	....	....	....	....	1	6	9	7	....	....	....	....	....
Lincoln Aircraft Co.	....	....	....	13	....	....	....	2	....	1	....	4	....	3	5	....	3	....	....	2	3	1	....	1	....	9
Mono Aircraft Co.	....	1	....	23	....	....	....	....	2	....	2	12	4	1	1	1	2	....	4	1	4	3	....	2	1	....
Pitcairn Aviation, Inc.	....	....	....	....	....	....	1	2	....	2	....	2	....	....	....	....	1	....	....	....	1	....	....	....	....	....
Ryan Aircraft Co.	1	1	....	20	2	....	....	6	....	1	1	6	4	2	1	1	2	....	....	2	4	3	....	11	1	1
Stearman Aircraft Co.	....	....	....	32	1	1	1	7	....	....	5	7	3	1	1	1	4	....	....	3	2	....	....	....	1	....
Stinson Airplane Co.																										
Stinson-Detroiter	1	....	....	5	....	....	....	....	....	....	....	9	1	1	1	....	1	1	....	3	12	5	....	3	1	2
Stinson, Jr.	....	....	....	2	....	....	....	....	....	....	....	1	....	2	....	....	....	....	....	....	3	1	....	....	....	1
Swallow Airplane Mfg. Co.	2	....	1	19	1	....	....	....	1	1	1	18	1	....	11	1	1	....	2	....	9	2	1	7	2	....
Travel Air Manufacturing Co.																										
Biplanes	2	1	4	102	4	5	....	5	8	4	....	32	10	11	26	3	9	1	7	22	35	5	1	40	2	14
Monoplanes	....	....	....	5	2	....	....	....	....	....	....	7	....	....	10	....	1	....	....	2	1	....	....	....	....	1
Waco Aircraft Co.	3	2	6	82	1	6	2	6	13	5	1	68	29	13	5	8	5	1	4	13	63	21	6	23	5	3
Foreign	....	....	....	6	....	9	....	4	....	....	....	1	....	....	....	....	2	....	....	2	2	....	....	....	....	....
Miscellaneous	1	1	....	67	1	5	12	16	1	1	1	50	4	2	4	....	4	....	....	16	28	8	....	19	1	4
Total	15	15	24	519	37	43	16	60	36	20	14	300	84	51	81	18	44	4	32	109	235	92	18	193	19	40

Analysis of Engine License Data by

	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	D. C.	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana	Nebraska
American Engines																										
Curtiss	....	....	....	1	....	....	....	2	2	1	....	5	2	....	....	....	2	....	....	1	5	2	....	9	1	2
Lambert-Velie	....	1	....	23	....	....	....	....	1	....	2	11	4	1	1	1	1	....	4	1	4	3	....	2	1	....
Pratt & Whitney-Wasp	....	1	....	32	1	1	....	2	....	....	....	10	1	1	4	....	1	....	....	....	6	9	....	14	1	....
Hornet	....	....	....	7	....	....	....	....	....	....	....	13	....	....	....	....	....	....	....	....	1	3	....	....	....	....
Warner Scarab	....	5	2	14	....	1	....	1	....	....	....	11	6	3	1	....	....	....	....	3	9	1	2	23	....	1
Wright-Whirlwind	2	4	....	114	8	6	14	28	....	3	2	63	10	9	12	3	18	1	2	23	53	15	....	26	3	6
Cyclone	....	....	....	....	....	....	....	....	....	....	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Miscellaneous	2	....	....	22	3	....	....	9	1	....	....	29	1	3	1	....	2	....	1	4	5	1	....	4	1	3
War Surplus Engines																										
OX5 and OXX6	11	2	22	256	5	25	2	13	31	14	3	152	52	33	56	14	15	3	22	62	141	52	15	105	13	25
Liberty	....	....	....	10	....	....	....	7	1	....	....	27	1	....	....	....	2	....	....	....	....	....	....	....	....	....
Hispano Suiza	....	2	....	36	20	1	....	3	....	1	2	4	4	1	6	....	3	....	3	8	4	4	1	6	....	2
Foreign Engines																										
Cirrus	....	....	....	3	....	9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Gipsy	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	2	....	....	....	....	....
Siemens Halske	....	....	....	10	....	....	....	....	1	1	....	....	4	....	....	....	1	....	....	5	4	2	....	4	....	1
Miscellaneous	....	....	....	....	....	....	....	2	....	....	....	2	....	....	....	....	1	....	....	....	1	....	....	....	....	....
Total	15	15	24	519	37	43	16	60	36	20	14	300	84	51	81	18	44	4	32	109	235	92	18	193	19	40

Upon Interpertation of

Makes (as of approximately July 1, 1929)

Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Alaska	Total	
1	....	16	1	22	5	1	8	10	2	14	1	7	12	4	13	5	....	15	8	....	10	7	....	386	Alexander
....	....	3	....	3	1	.....	8	13	5	5	1	1	3	1	9	1	....	.....	.....	....	9	....	....	156	American Eagle
																									Boeing
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....	23	....	....	....	....	26	40
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....	13	....	....	....	....	24	95
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....	8	....	....	....	....	9	*Miscellaneous*
....	....	....	....	18	....	....	1	3	....	....	....	....	....	2	5	....	....	.....	2	....	1	....	....	79	Command-Aire
																									Curtiss
....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	.....	....	....	....	....	....	10	*Falcon*
....	....	....	....	40	....	....	....	....	....	....	....	....	....	....	....	....	....	.....	....	....	....	....	....	45	*Fledgling*
....	....	3	....	4	....	....	....	....	....	....	....	....	....	....	....	....	....	.....	....	....	....	....	....	20	*Miscellaneous*
1	....	6	....	163	1	2	4	4	1	4	....	....	....	7	20	....	....	.....	2	....	3	....	....	290	Curtiss-Robertson
....	....	1	....	54	....	....	6	2	....	13	....	....	1	....	1	1	....	.....	....	....	5	....	....	126	Fairchild
....	....	....	....	23	....	....	2	9	....	4	....	....	....	....	2	....	....	.....	....	1	3	....	....	90	Fleet
																									Fokker
....	....	....	....	5	....	....	....	....	....	....	....	....	....	....	....	2	....	.....	....	....	....	....	....	38	*Wasp*
....	....	....	....	5	....	....	....	....	....	....	....	....	....	....	....	....	....	.....	....	....	....	....	....	7	*Wright*
....	....	3	....	4	....	....	....	....	....	....	....	....	....	....	3	1	....	.....	....	....	....	....	....	25	*Univ. & S. U.*
																									Ford Motor
....	....	....	....	15	....	....	....	8	....	....	....	....	....	....	....	....	....	.....	....	....	....	....	....	36	*Wasp*
....	....	....	....	5	....	....	3	....	....	1	....	....	1	....	....	....	....	.....	1	....	1	....	....	38	*Wright*
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....	....	....	....	....	....	2	*Miscellaneous*
....	....	4	....	11	3	.....	3	.....	.....	33	3	1	.....	.....	.....	.....	.....	1	1	....	.....	.....	....	99	Kreider-Reisner
9	....	....	....	2	....	.....	4	.....	1	1	....	....	1	2	.....	.....	.....	.....	1	....	1	1	....	61	Lincoln
....	....	....	....	3	5	1	6	4	.....	7	....	....	4	.....	6	1	....	.....	3	....	10	....	....	114	Mono
....	....	2	....	13	4	.....	.....	.....	.....	30	....	2	.....	.....	5	.....	....	2	.....	....	.....	....	....	67	Pitcairn
1	....	....	1	8	....	1	5	5	2	7	1	....	2	.....	14	1	....	.....	3	....	6	....	....	126	Ryan
....	1	1	....	18	....	.....	5	4	.....	.....	.....	.....	.....	.....	4	3	....	.....	4	....	.....	.....	....	110	Stearman
																									Stinson
2	....	1	....	16	....	.....	10	5	.....	1	....	....	.....	3	5	.....	....	.....	1	....	1	....	1	90	*Detroiter*
1	....	....	....	....	1	.....	2	.....	.....	5	....	....	.....	.....	1	1	1	.....	.....	....	1	....	....	23	*Junior*
....	1	5	....	14	....	1	14	4	.....	7	....	....	.....	1	8	.....	....	1	3	1	9	....	3	153	Swallow
																									Travel Air
14	1	16	1	59	.....	3	31	23	12	33	1	....	1	2	32	4	1	3	11	3	14	2	2	608	*Biplanes*
1	1	1	....	3	....	.....	2	4	1	1	....	....	.....	.....	16	.....	....	.....	.....	....	.....	.....	....	58	*Monoplanes*
3	6	24	....	115	9	4	79	15	11	67	1	2	3	9	13	1	4	3	14	....	39	....	1	814	Waco
....	....	....	....	9	....	.....	3	.....	.....	2	....	....	.....	.....	2	.....	....	.....	.....	....	.....	.....	....	42	Foreign
4	....	11	....	119	....	1	34	21	1	9	1	....	.....	2	14	.....	....	1	10	2	8	.....	....	469	Miscellaneous
40	9	97	3	753	29	14	230	134	36	244	9	13	28	33	173	21	6	26	108	7	121	10	7	4,232	Total

Makes (as of approximately July 1, 1929)

Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	West Virginia	Washington	Wisconsin	Wyoming	Alaska	Total by Types	TOTAL	
																										American Engines
....	....	4	....	94	....	....	5	3	....	2	....	....	....	2	10	....	....	....	1	1	....	....	....	157		Curtiss
....	....	1	....	3	4	1	4	4	1	7	....	....	4	2	5	1	....	....	....	3	10	....	....	111		Lambert-Velie
....	....	1	....	70	....	....	8	15	....	2	....	....	....	....	4	3	....	....	....	17	3	....	....	207		Pratt & Whitney-Wasp
....	....	....	....	2	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	26	2	....	....	55		Hornet
1	....	1	....	57	1	....	12	13	....	11	....	....	....	1	3	1	....	....	....	....	5	....	....	188		Warner Scarab
6	1	3	11	2	126	2	2	48	23	5	61	1	1	4	6	56	6	1	....	1	16	24	....	3	828		Wright-Whirlwind
....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	8		Cyclone
3	....	....	....	....	16	....	....	9	1	....	4	....	....	2	....	4	1	....	....	1	....	3	1	....	133		Miscellaneous
																										1,687
																										War Surplus Engines
25	....	5	65	1	357	21	10	131	61	27	150	7	12	16	20	77	5	5	21	4	41	71	7	4	2,262		OX5 and OXX6
....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	3	....	....	....	....	....	....	....	....	53		Liberty
2	1	1	11	....	5	....	1	9	2	3	4	....	....	2	2	8	4	....	4	....	3	3	2	....	176		Hispano Suiza
																										2,491
																										Foreign Engines
....	....	....	....	....	1	....	....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	15		Cirrus
....	....	....	....	....	6	....	....	....	....	....	1	1	....	....	1	....	....	....	....	....	....	....	....	....	13		Gipsy
1	....	....	1	....	4	....	....	2	6	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	48		Siemens Halske
....	....	....	2	....	10	1	....	....	6	....	....	....	....	....	4	....	....	1	....	....	....	....	....	....	31		Miscellaneous
																										107
2	9	97	3	753	29	14	230	134	36	244	9	13	28	33	173	21	6	26	7	108	121	10	7	.....	4,232	Total

these tables see page 698

Airplane Licenses by Makes

Waco Aircraft Co.		814
Travel Air Mfg. Co.		666
	Biplanes 608	
	Monoplanes 58	
Alexander Aircraft Co. (Eaglerock)		386
Curtiss-Robertson Airplane Mfg. Co. (Robin)		290
American Eagle Aircraft Corp.		156
Swallow Airplane Mfg. Co.		153
Fairchild Airplane Mfg. Co.		126
Ryan Aircraft Co.		126
Mono Aircraft Co.		114
Stinson Airplane Co.		113
	Stinson Detroiter 90	
	Stinson Jr. 23	
Stearman Aircraft Co.		110
Kreider Reisner Aircraft Co. (Challenger)		99
Fleet Aircraft Co.		90
Command-Aire, Inc.		79
Ford Motor Co. (Stout Airplane Division)		75
	Wasp powered 36	
	Wright powered 38	
	Miscellaneous 1	
Pitcairn Aviation, Inc.		67
Curtiss Aeroplane & Motor Co. (Not including JN or MF)		65
	Falcon 10	
	Fledgling 45	
	Miscellaneous 10	
Fokker Aircraft Corp.		62
	Wasp powered 30	
	Wright powered 7	
	Universals 25	
Lincoln Aircraft Co.		61
Boeing Airplane Co.		59
	"40" 26	
	"95" 24	
	Miscellaneous 9	
Cessna Aircraft Co.		48
Lockheed Aircraft Corp.		37
Buhl Aircraft Co.		29
International Aircraft Co.		27
The Douglas Co.		26
Bellanca Aircraft Co.		24
Sikorsky Aviation Corp.		22
Miscellaneous American		260
Foreign planes		42
Total licensed aircraft as of July 15, 1929		4232

THESE DATA, together with those on the two preceding pages, must be taken as exactly what they are, neither more nor less. The large tables represent the number of airplanes licensed by the Department of Commerce, as included in a list compiled by the Aeronautical Chamber of Commerce as of July 15, 1929, but apparently covering licenses actually issued up to the early part of June. Those on this page are taken from the Aeronautical Chamber's weekly lists of licenses granted from April 20 to Sept. 1, inclusive. Assuming accurate tabulation, the figures would correspond to the number of machines of each type in service in each state, minus the number of planes merely bearing identification marks. Although the identified planes are more than one-third of the total number in service, the great majority among them is composed of equipment of war-time design or of planes being built in such small quantities that they would in any case appear in the miscellaneous group in the above tabulation. That has been so true in recent months that in a two-week period taken as typical only ten per cent of the newly identified planes were found to be of any of the makes separately listed in the table here presented.

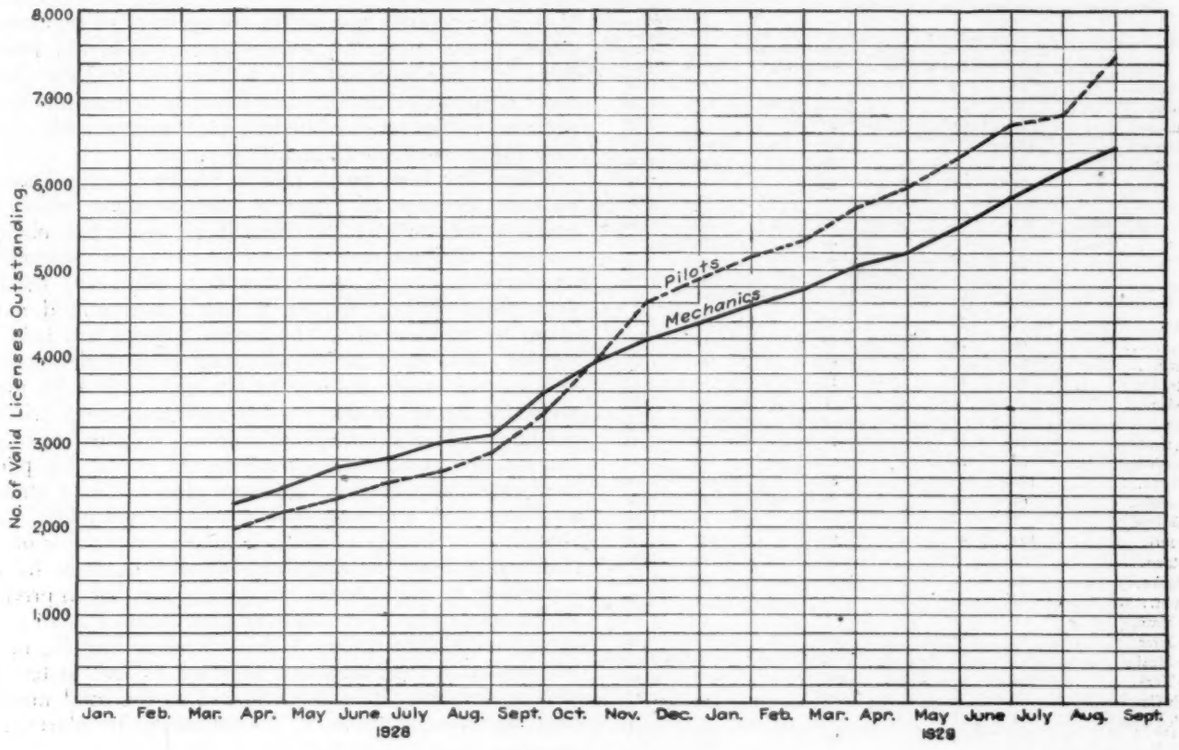
The definition of "planes in service" varies somewhat with the manufacturer. In some cases all machines are licensed as built, and that is an increasingly common practise. In those instances, the figures on total new licenses would correspond accurately with total production. There are other cases, however, in which planes are licensed only when they reach the dealer or when they pass into the hands of the final owner. In any event, machines shipped immediately for export are unlikely to have licenses. All of those factors must be borne in mind in interpreting the license figures, but they remain the best available index for a classification of planes in service and of the new machines being produced in the United States.

The classification here, as in the more extended table on page 696 has been made entirely on the basis of trade names without reference to financial alliances. If the totals of outstanding licenses as of the July 15 list be taken for the several groups of companies that have recently been merged, the aggregate figure for the Curtiss-Wright Corporation is 1021 planes, that for the United Aircraft and Air Transport Company is 191, and for the Fairchild Company 225. The five largest manufacturing groups are responsible in the aggregate for 2,637 planes, or 62 per cent of the total number then licensed. Of the new licenses issued from April 20 to August 31, inclusive, they account for 63 per cent. The corresponding figure for the automobile industry, based on new registrations only, would be something over 85 per cent for the five largest manufacturing corporations (counting General Motors, for example, as a single company).

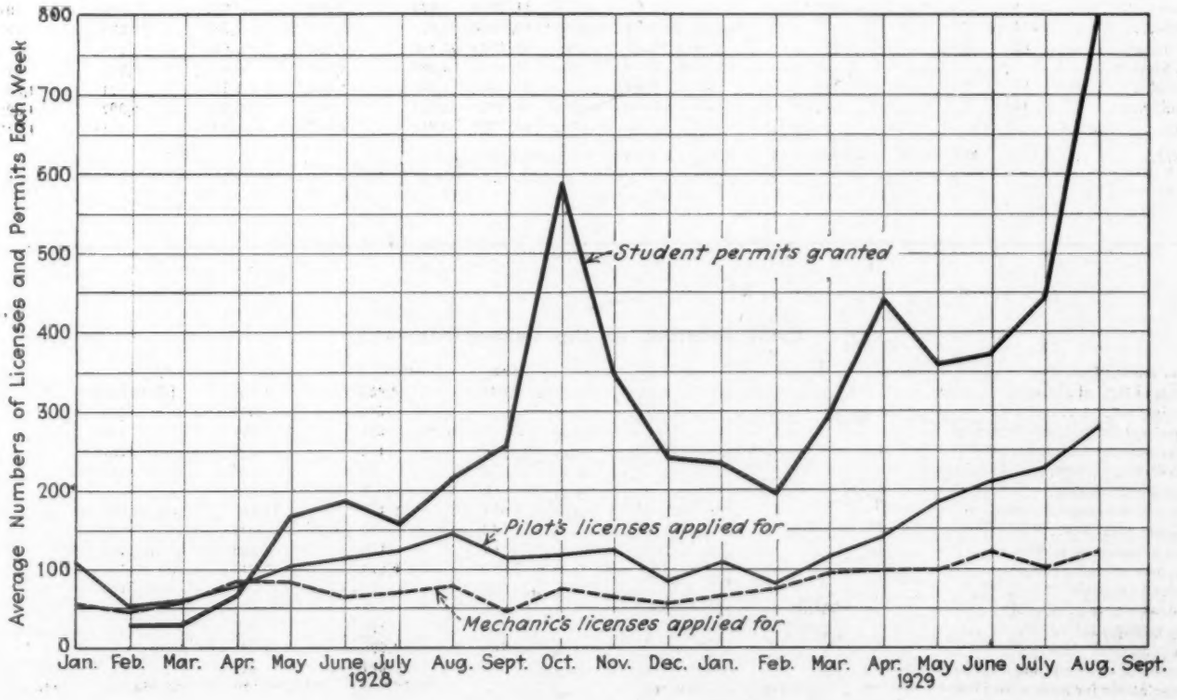
The geographical distribution of the planes must not be given exaggerated importance. Although in most cases the actual location of domicile of the airplane is correctly represented by the tables on pages 696 and 697. there are some exceptions. Many planes, for example, are registered before sale in the name of a distributor who may operate through branches in states other than that in which he has his headquarters. Another exception applies especially to the large transport machines and amphibions. The preponderance of registration of transport machines in New York, California, Michigan, and two or three other states is partly accounted for by their being licensed at the administrative headquarters of the large transport companies operating them.

Licenses Recently Granted, by Makes

Make	Apr. 20 to June 30	July 1 to Aug. 31	Total
Curtiss Robin	155	133	288
Curtiss Fledgling	28	28	56
Waco	147	129	276
Travel Air Biplane	99	70	169
Travel Air Monoplane	37	29	66
Eaglerock	73	42	115
Fleet	60	51	111
American Eagle	38	56	94
Command-Aire	32	45	77
Swallow	38	27	65
Challenger	25	34	59
Monocoupe	34	20	54
Fairchild	25	24	49
Stearman	24	19	43
Stinson	14	28	42
Ford	13	24	37
Cessna	25	12	37
Fokker	18	17	35
New Standard	13	18	31
Ryan	11	17	28
Avro	12	15	27
Lockheed	8	18	26
Moth	9	15	24
Boeing	15	5	20
Miscellaneous	124	154	278
Totals	1,077	1,030	2,107



Pilots' and Mechanics' Licenses in Force



Personnel Licenses Applied for Weekly

Classification of Pilots Licensed in the United States as of August 15, 1929

	Transport	Limited Commercial	Limited Industrial	Private	Unclassified	Total	Ratio of Licensed Pilots to Licensed Aircraft
Alabama	28	4	1	4	..	37	2.46
Arizona	16	6	..	5	..	27	1.80
Arkansas	26	6	2	21	..	55	2.30
California	731	151	..	561	6	1,464	2.82
Colorado	36	6	15	21	..	63	1.70
Connecticut	31	8	..	17	..	56	1.30
Delaware	6	1	..	1	..	8	0.50
District Columbia	163	2	1	38	4	208	3.46
Florida	77	9	..	40	2	128	3.53
Georgia	21	8	..	19	2	50	2.50
Idaho	12	1	..	3	..	16	1.14
Illinois	219	53	2	96	4	374	1.25
Indiana	75	29	1	25	2	132	1.57
Iowa	46	20	..	19	..	85	1.67
Kansas	80	21	..	43	..	144	1.78
Kentucky	17	10	..	13	..	40	2.22
Louisiana	31	4	2	7	2	46	1.05
Maine	5	4	..	4	..	13	3.25
Maryland	38	13	2	23	..	76	2.37
Massachusetts	68	24	3	65	2	162	1.49
Michigan	190	49	1	81	..	321	1.36
Minnesota	66	19	2	39	1	127	1.38
Mississippi	8	3	1	16	..	28	1.58
Missouri	124	45	4	54	..	227	1.18
Montana	22	6	..	6	..	34	1.79
Nebraska	43	8	2	16	..	69	1.72
Nevada	2	1	1	3	..	7	3.50
New Hampshire	6	1	..	5	..	12	1.33
New Jersey	54	21	..	60	1	136	1.40
New Mexico	5	1	..	2	1	9	3.00
New York	294	74	13	247	4	632	0.84
North Carolina	22	4	..	18	..	44	1.52
North Dakota	8	1	..	5	..	14	1.00
Ohio	167	58	1	94	..	320	1.39
Oklahoma	75	25	4	46	..	150	1.12
Oregon	36	5	1	13	..	55	1.53
Pennsylvania	144	57	10	116	5	332	1.36
Rhode Island	12	3	..	8	..	23	2.56
South Carolina	12	1	..	1	..	14	1.08
South Dakota	23	6	..	12	..	41	1.46
Tennessee	28	5	..	28	1	62	1.85
Texas	242	18	5	77	3	345	2.00
Utah	17	8	..	8	..	33	1.57
Vermont	4	1	..	1	..	6	1.00
Virginia	111	11	1	7	2	132	5.08
Washington	82	29	..	31	..	142	1.28
West Virginia	9	1	..	6	..	16	2.30
Wisconsin	57	33	2	34	..	126	1.04
Wyoming	18	5	..	2	..	25	2.50
Alaska	5	...	1	1	..	7	1.00
Total	3,612	879	78	2,062	42	6,673	1.58

THE PROPORTION of private pilots' licenses as shown by the table runs highest, and that of transport certificates lowest, in the states where flying as a sport has been most popular and where stringent state regulations make it convenient for every pilot to hold the federal license. Thus in Massachusetts, New York, New Jersey and California private licenses make up approximately 40 per cent of the total, while in typical mid-western states they fall to between 22 and 30 per cent.

There has been much talk in recent months about a possible shortage of pilots, a question upon which the curve at the top of the right hand page has obvious bearing. The number of pilots should equal the number of planes if it were not for the facts that: (a) the law does not definitely require a pilot's license and many pilots fly without one; (b) many licenses are held by service pilots only rarely operating commercial planes; (c) a considerable number of licensed pilots have given up active flying, or fly only intermittently on a friend's machine; (d) a considerable number of planes are used for giving instructions to students not yet having pilots' licenses of any grade; (e) some planes are in storage awaiting sale, and temporarily require no pilots. Although it is hardly possible to make even an approximate estimate of the magnitude of each of these factors separately, it would seem that those operating to produce an excess of plane licenses over pilot licenses at all times should more than counterbalance those having the opposite tendency. An apparent shortage of five to ten per cent in licensed pilots as compared to the total number of planes should therefore be no cause for alarm.

Periodical Records of Pilots' and Mechanics' Licenses

Date Quarterly	Number of Pilots' Licenses Valid	Number of Mechanics' Licenses Valid	Number of New Pilots' Licenses Applied for in Preceding 3 Mos.	Number of New Students' Permits Granted in 3 Mos.	Number of New Mechanics' Licenses Applied for in 3 Mos.
Mar. 31, 1928	1,973	2,298	881	243	707
June 30, 1928	2,535	2,816	1,285	1,804	988
Sept. 30, 1928	3,340	3,102	1,659	2,793	831
Dec. 31, 1928	4,887	4,383	1,426	4,935	813
Mar. 31, 1929	5,701	5,042	1,353	3,191	1,035
June 30, 1929	6,761	5,847	2,394	5,097	1,305
Aug. 30, 1929	7,466	6,432	2,332[1]	5,766[1]	1,035[1]

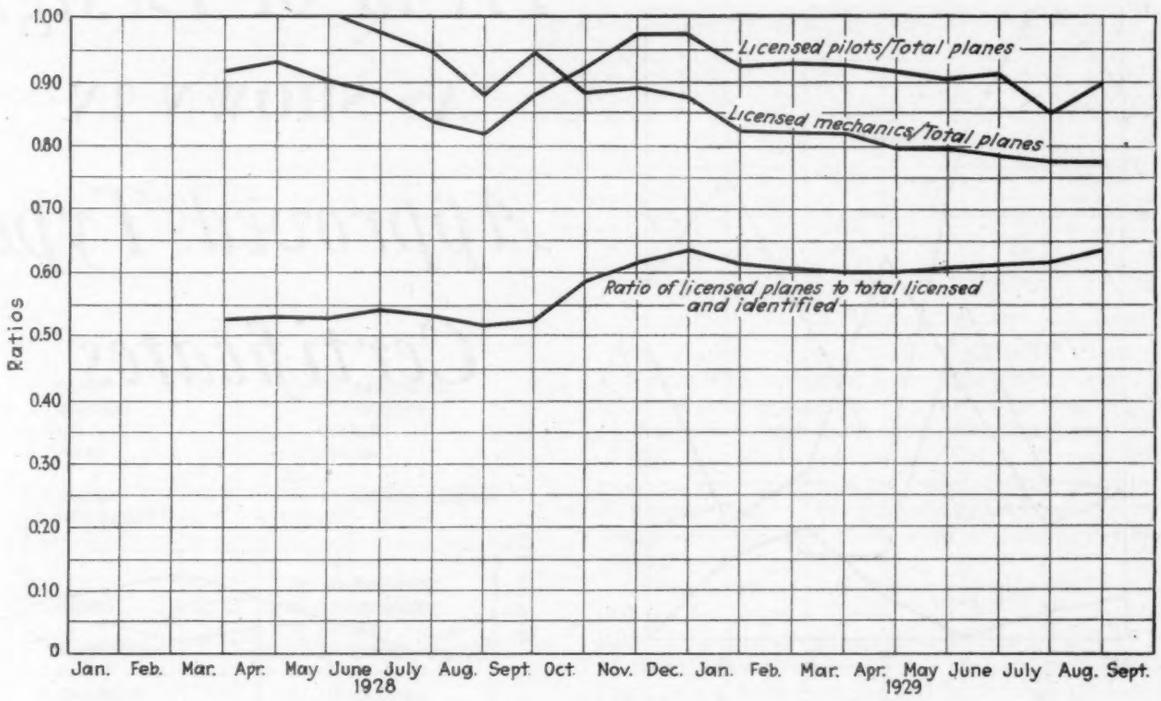
[1]Two months only.

Civil Aviation in the United States

Year ending Dec. 31	1926	1927	1928	1929 (b)	1930
Mileage of lighted airways	2,041	4,468	6,988	(a) 10,000	.....
Municipal airports	.....	240	412	420	.....
Commercial and private airports	.....	263	391	410	.....
Lighted intermediate fields	92	134	210	281	.....
Radio stations (Dept. of Commerce)	17	19	29	34	.....
Private light beacons	0	8	54	.....	.....
Mileage of commercial airways	8,404	9,121	16,667	(a) 30,000	.....
Transport operators	14	19	37	45	.....
Planes in transport service	69	128	268	(a) 400	.....
Passengers carried on transport lines	5,782	8,679	49,713	(b) 40,000	.....
Approved airplanes	0	21	96	170	.....
Approved engines	0	0	13	25	.....
Flying schools	175	375	475	575	.....
Production of airplanes	1,186	1,995	4,346	.....	.....
Government consumption, airplanes	532	621	857	.....	.....
Appropriations for aeronautics branch, Dept. of Commerce	.....	*$550,000	*$3,791,500	*$5,434,350	*$6,416,620

*Fiscal year ending June 30. (a) Estimated. (b) Up to July 1, 1929.

See also pages 704 and 705



Ratios Between Planes and Personnel, and Proportion of American Planes Licensed

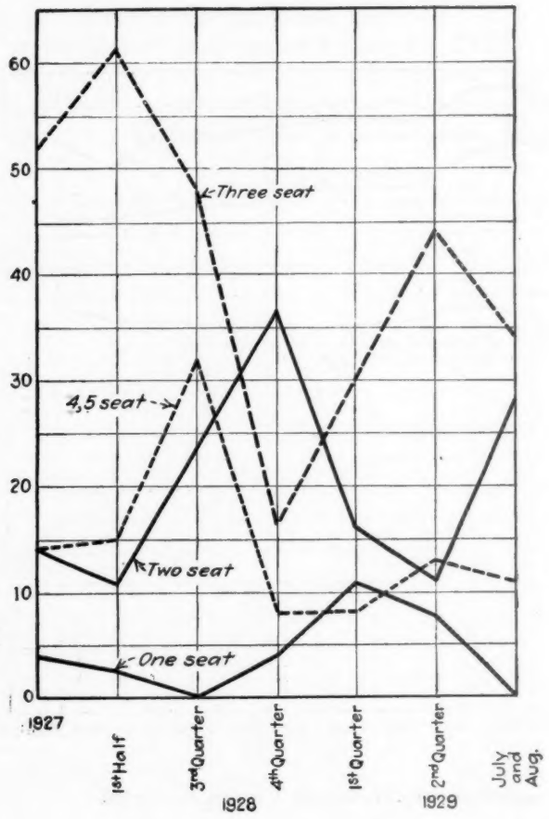
Airplane Design Tendencies

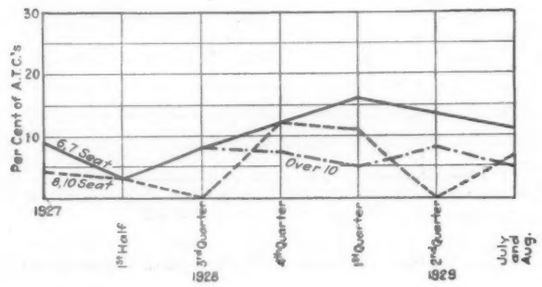
Period	No. New A.T.C.	Monoplane No.	Monoplane Per Cent	Biplane No.	Biplane Per Cent	Open No.	Open Per Cent	Closed No.	Closed Per Cent	Landplane No.	Landplane Per Cent	Seaplane No.	Seaplane Per Cent	Land and Sea No.	Land and Sea Per Cent	Amphibion No.	Amphibion Per Cent	Two-Engine No.	Two-Engine Per Cent	Three-Engine No.	Three-Engine Per Cent
1927	21	4	19	17	81	14	66	7	33	19	90	0	00	2	9	0	00	1	4	0	00
1st half 1928	26	8	31	18	69	15	57	11	42	24	92	1	03	0	00	1	04	0	00	0	00
3rd quarter 1928	25	11	44	14	56	9	36	16	64	19	76	1	04	2	08	3	12	1	04	1	04
4th quarter 1928	24	11	46	13	54	12	50	12	50	20	83	0	00	2	07	2	08	0	00	3	12
1st quarter 1929	36	12	33	24	66	20	55	16	44	35	97	0	00	0	00	1	03	2	05	2	05
2nd quarter 1929	36	13	36	23	63	21	58	15	41	34	94	1	02	0	00	1	03	1	02	2	05
3rd quarter to Sept. 7 1929	52	21	40	31	59	30	58	22	42	46	88	4	07	1	02	1	02	1	01	5	09
Total	220	80	36	140	63	121	55	99	45	197	89	7	03	7	03	9	04	6	02	13	05

Period	No. New A.T.C.	Single Seat No.	Single Seat Per Cent	2-Seat No.	2-Seat Per Cent	3-Seat No.	3-Seat Per Cent	4 & 5-Seat No.	4 & 5-Seat Per Cent	6 & 7-Seat No.	6 & 7-Seat Per Cent	8-10-Seat No.	8-10-Seat Per Cent	Over 10-Seat No.	Over 10-Seat Per Cent	Avg. Ratio Useful Load to Total Wt.	Average Power Loading
1927	21	1	05	3	14	11	52	3	14	2	09	1	05	0	00	.40	17.2
1st half 1928	26	1	03	3	11	16	61	4	15	1	04	1	04	0	00	.32	17.4
3rd quarter 1928	25	0	00	1	04	12	48	8	32	2	08	0	00	2	08	.40	15.6
4th quarter 1928	24	1	04	9	37	4	16	2	08	3	12	3	12	2	08	.31	16.5
1st quarter 1929	36	4	11	6	16	11	30	3	08	6	16	4	11	2	05	.40	16.5
2nd quarter 1929	36	3	08	4	11	16	44	5	14	5	14	0	00	3	08	.38	15.1
3rd quarter to Sept. 7 1929	52	0	00	15	29	18	34	6	11	6	11	4	07	3	06	.37	16.2
Total	220	10	04	41	18	88	40	31	14	25	11	13	05	12	05	.37	16.3

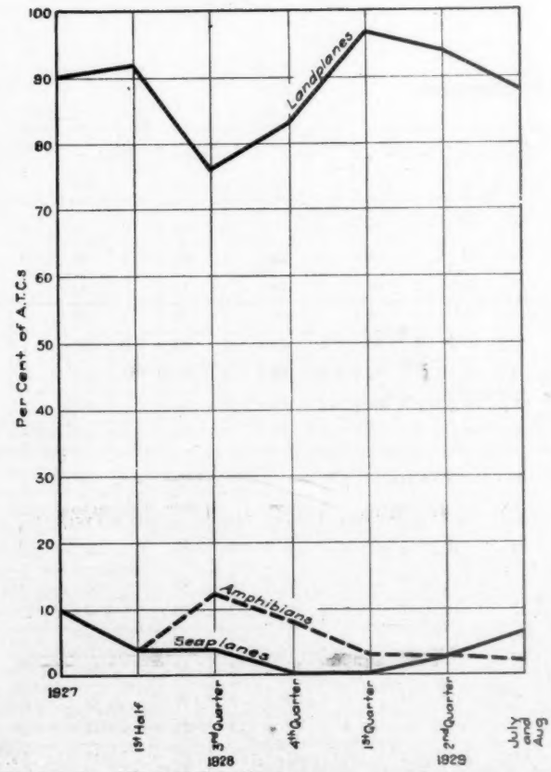
See pages 702 and 703

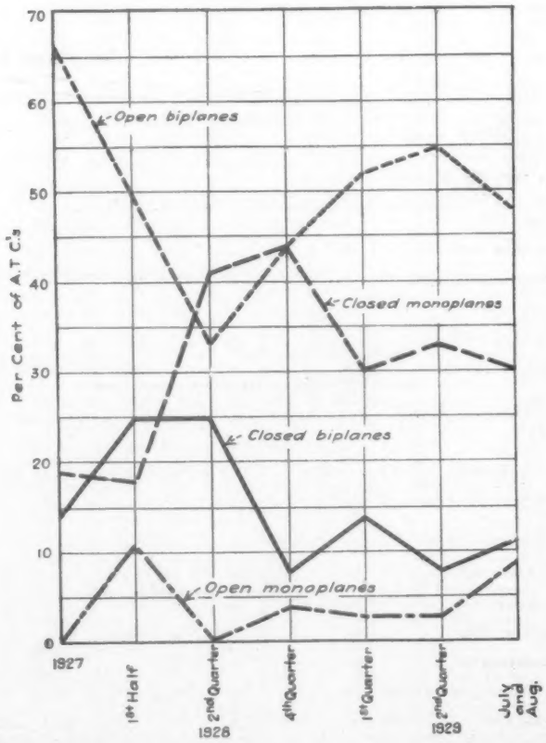
Trend OF Design AS SHOWN IN Approved Type Certificates





Designs Grouped by Seating Capacity





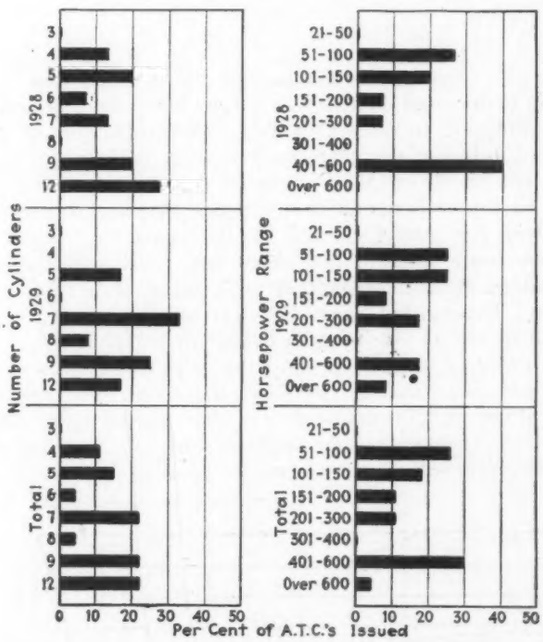
Proportionate Distribution of Designs by General Types

Engines and Propellers

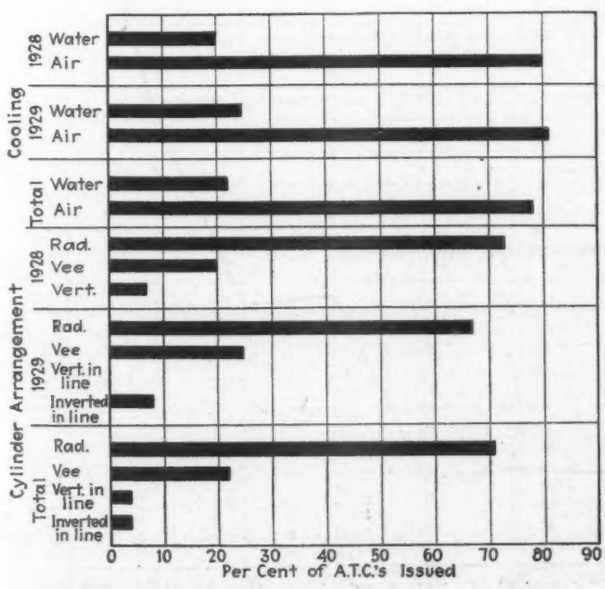
Period	No. of A.T.C.	Average Output Hp.	Average Output R.p.m.	Cooling: Air Cooled No.	%	Cooling: Water Cooled No.	%	Cylinder Arrangement: Radial No.	%	Vee No.	%	Vert. in Line No.	%	Inverted in Line No.	%	Horsepower Range: 21–50 Hp. No.	%	51–100 Hp. No.	%	101–150 Hp. No.	%	151–200 Hp. No.	%	201–300 Hp. No.	%	301–400 Hp. No.	%	401–600 Hp. No.	%	Over 600 Hp No.	%
1928	15	280	1,920	12	80	3	20	11	73	3	20	1	7	0	0	0	0	4	27	2	13	2	13	1	7	0	0	6	40	0	0
1929 (to July)	12	270	1,920	9	75	3	25	8	67	3	25	0	0	1	8	0	0	3	25	3	25	1	8	2	17	0	0	2	17	1	8
Total	27	...	.....	21	78	6	22	19	71	6	22	1	4	1	4	0	0	7	26	5	18	3	11	3	11	0	0	8	30	1	4

Period	No. of A.T.C.	Number of Cylinders: 3-Cylinder No.	%	4-Cylinder No.	%	5-Cylinder No.	%	6-Cylinder No.	%	7-Cylinder No.	%	8-Cylinder No.	%	9-Cylinder No.	%	12-Cylinder No.	%
1928	15	0	0	2	13	3	20	1	7	2	13	0	0	3	20	4	27
1929 (to July)	12	0	0	1	8	2	17	0	0	3	25	1	8	3	25	2	17
Total	27	0	0	3	11	5	15	1	4	5	22	1	4	6	22	6	22

Period	No. of A.T.C.	Propellers to April 29, 1929: Wood No.	%	Alum. Alloy No.	%	Composition No.	%
1928	5	1	20	3	60	1	20
1929	83	13	16	68	82	2	2
Total	88	14	16	71	81	3	3



Grouping of Engine Designs by Type and Power



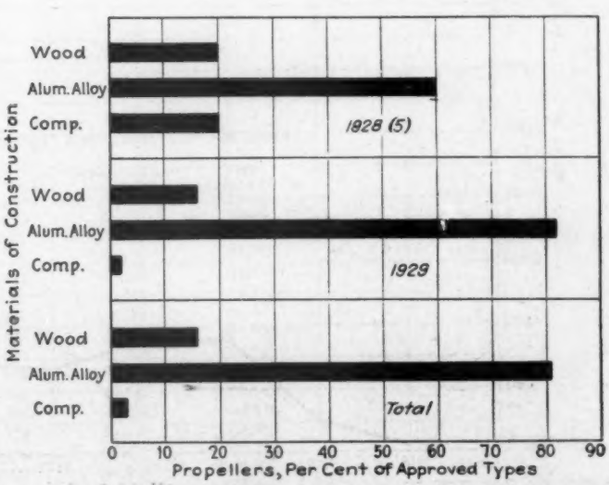
Cylinder Arrangement and Cooling of Engines

AN ANALYSIS of the group of airplanes, engines and propellers having approved type certificates is herewith presented in an effort to show the general tendencies of design. In each case the approved designs for two or more periods have been classified as to types and the numbers and per cent of the totals for each period given in tabular form. The graphs and bar charts show the variation in per cent of the total of each type for each period.

In the airplane design table on page 701, the approved designs are divided into seven groups on the basis of the period during which they were issued. Each of these groups is broken down into several classifications on the basis of types and in the case of each type the percentage of the total number in the group is given. These percentages are plotted graphically against the various periods of time on page 702.

The same principle of analysis has been applied to the engine designs that have received approved type certificates up to July of this year. On account of the limited number of engines approved thus far it was thought advisable to divide these designs into only two groups as indicated above. For this reason the percentages of each type for each group have been shown by means of bar charts.

A similar analysis of the type certificates issued for propellers also has been made and, as in the case of the engines, two general groups have been made on the basis of time. A bar chart showing the percentages of approved types is shown below, while the table from which it is derived is given above.



Propeller Grouping by Materials of Construction

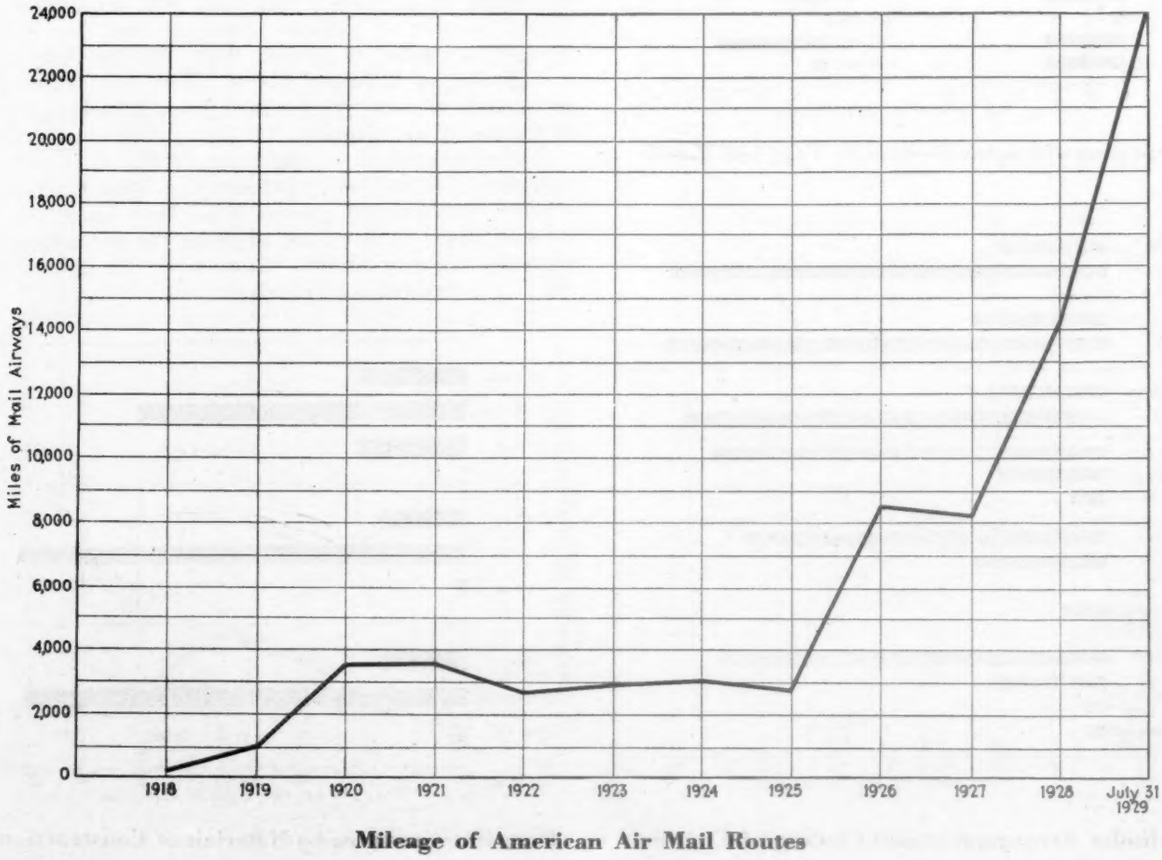
DEVELOPMENT OF Air Transport Activities IN T

THE EFFECTS of the Air Commerce Act, of the Contract Air Mail Bill, and of the measure extending the contract privilege to foreign air mails are very apparent from the long-term graph on this page. The first real stimulus to the lay-out of routes and the corresponding up-turn of the curve came in 1926 with the passage of the Contract Air Mail Bill. In 1928 and in the present year a substantial part of the increase has been due to the letting of contracts for foreign mails. Roughly speaking, the scope of the air mail service doubled in 1926, doubled again in 1928, and will double yet again in the present year.

At the same time the increase of non-mail carrying operations is marked. At the end of May, 1928, more than 80 per cent of the daily scheduled mileage was made under mail contracts. A year later the proportion had dropped to almost exactly two-thirds, and at the end of July the aggregate daily mileage completely independent of Post-Office support was almost equal to the total for all operations fourteen months previously.

Over the period carried by the chart the ratio between route mileage and daily scheduled mileage has remained almost constant at an average of a trifle less than 1.2 round trips per day over all the routes. Few of them are as yet being operated intensively.

Although there was a temporary check to the increase of total route mileage in 1927, the increase in private operation was pronounced. It was during 1927 that the transcontinental air mail was turned over by the Post Office department to private contractors.

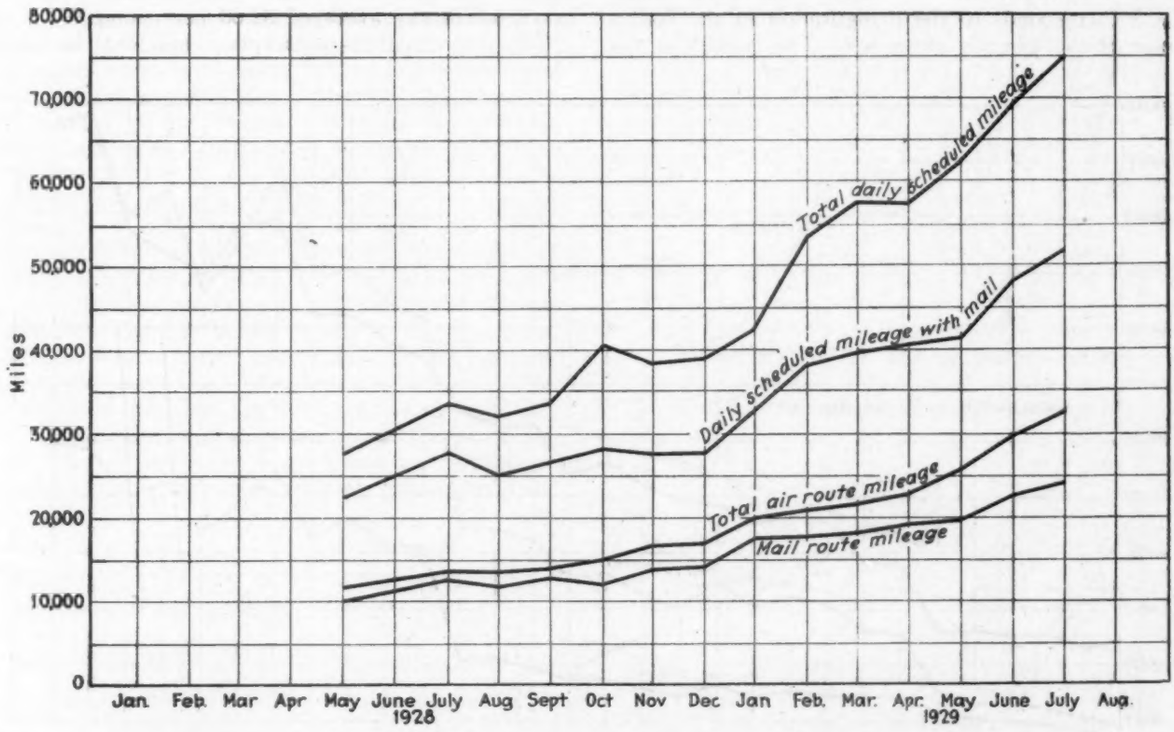


Mileage of American Air Mail Routes

THE *United States*

Miles of U. S. Mail Airways

Dec. 31, 1918	218
Dec. 31, 1919	930
Dec. 31, 1920	3,509
Dec. 31, 1921	3,509
Dec. 31, 1922	2,738
Dec. 31, 1923	2,842
Dec. 31, 1924	3,010
Dec. 31, 1925	2,813
Dec. 31, 1926	8,410
Dec. 31, 1927	8,223
Dec. 31, 1928	14,155
July 31, 1929	24,088



Recent Increases in Route Mileage and Distance Flown in American Air Transport

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Airway and Operation Mileage for Last 14 Months

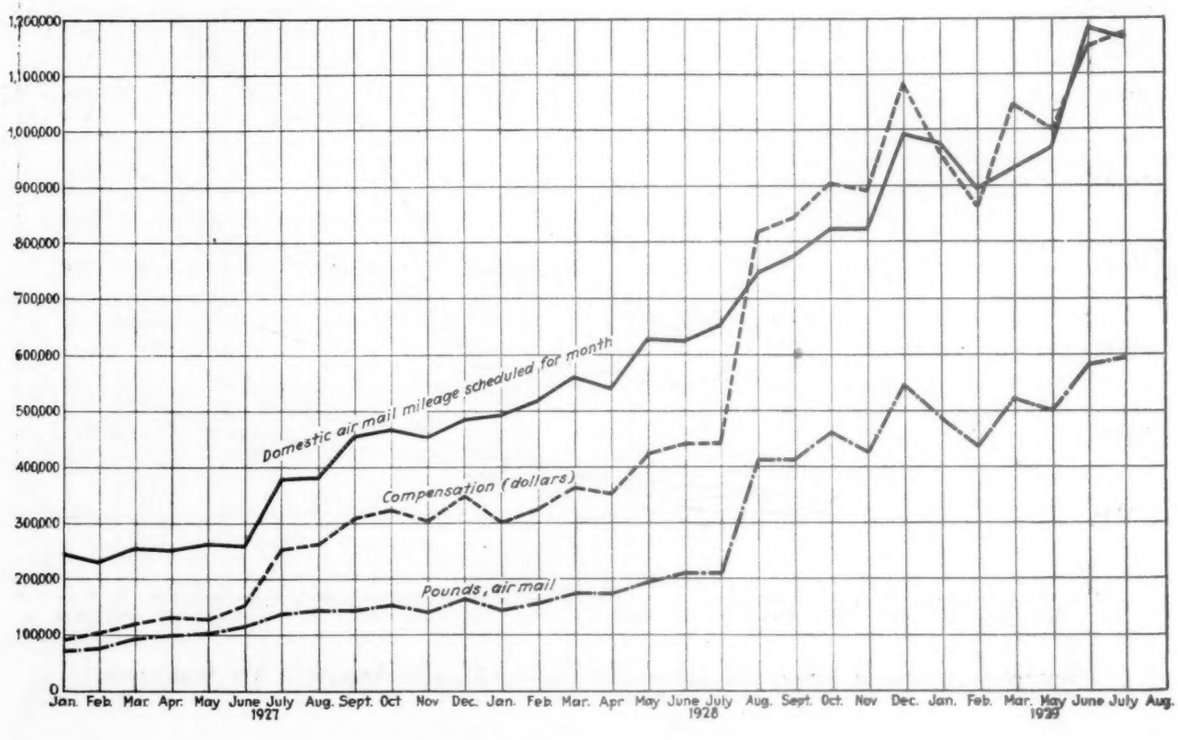
	Miles of Mail Airways	Total Miles of Airways	Airplane Miles Scheduled Daily with Mails	Total Airplane Miles Scheduled Daily
May 30, 1928	10,058	11,067	22,448	27,493
July 31, 1928	12,171	13,108	27,660	33,317
Aug. 31, 1928	11,921	13,133	25,288	32,042
Sept. 30, 1928	12,397	13,609	26,240	33,792
Oct. 31, 1928	12,397	14,941	28,204	40,602
Nov. 30, 1928	13,974	16,486	27,606	38,902
Dec. 31, 1928	14,155	16,667	27,848	39,060
Jan. 31, 1929	17,470	19,888	32,816	42,698
Feb. 28, 1929	17,470	20,788	38,045	53,345
Mar. 31, 1929	18,074	21,392	39,216	57,516
Apr. 30, 1929	19,022	22,778	40,472	57,653
May 31, 1929	19,721	25,336	41,929	62,265
June 30, 1929	22,465	29,227	48,068	69,029
July 31, 1929	24,088	32,496	52,070	74,970

UNITED STATES *Air Mail Operations*

THE CURVES of air transport development, and especially those for the air mail service, have to be read in terms of legislative history. Thus, for several years in the early part of the present decade the air mail planes were loaded with regular first-class mail at no extra charge, and the public had no direct control over the weight carried. The sharp drop of poundage in 1925 corresponds to the inauguration of the special air mail stamp and the extra fee. The equally abrupt rise in August, 1928, came at the time of the lowering of the charge from ten cents per half ounce to five cents per ounce.

Ever since the summer of 1927 the curves of weight of mail carried and of compensation paid by the contractors have been almost interchangeable, merely being plotted on different scales. Compensation has very nearly uniformly averaged $2.00 per pound.

The compensation per airplane mile has been more



Development of Airmail Service

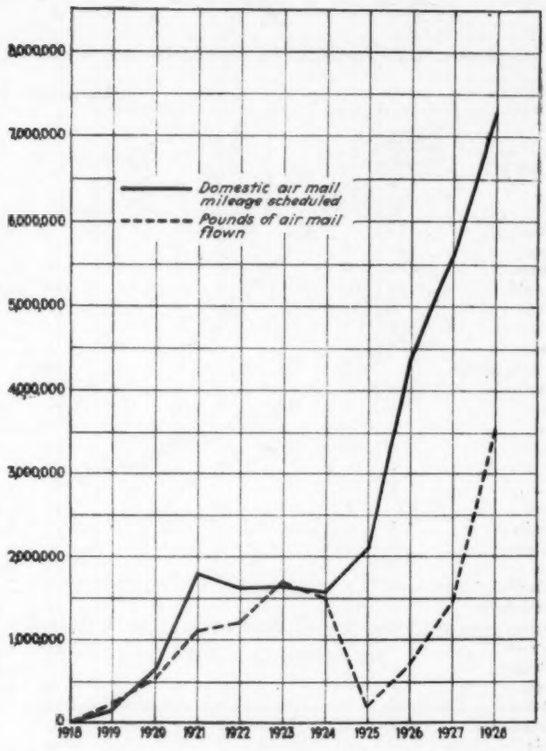
Year	Air Mail Mileage Scheduled	Air Mail Mileage Flown	Per Cent of Schedule Flown	Pounds of Air Mail
1918	18,080	16,009	88.94	17,831
1919	166,843	160,066	95.92	230,251
1920	653,764	549,244	84.00	526,573
1921	1,819,978	1,554,985	85.45	1,120,852
1922	1,629,250	1,537,927	94.41	1,224,723
1923	1,644,457	1,590,637	96.71	1,696,896
1924	1,590,425	1,522,763	95.12	1,500,034
1925	2,160,022	2,076,764	96.15	[1]232,513
1926	.....	4,240,407	.....	703,310
1927	5,656,642	5,258,320	92.96	1,452,426
1928	7,289,900	7,026,600	96.52	3,542,074

[1] Only specially paid air mail was carried during 1925 and thereafter. Up to that time ordinary first-class mail had been carried by air.

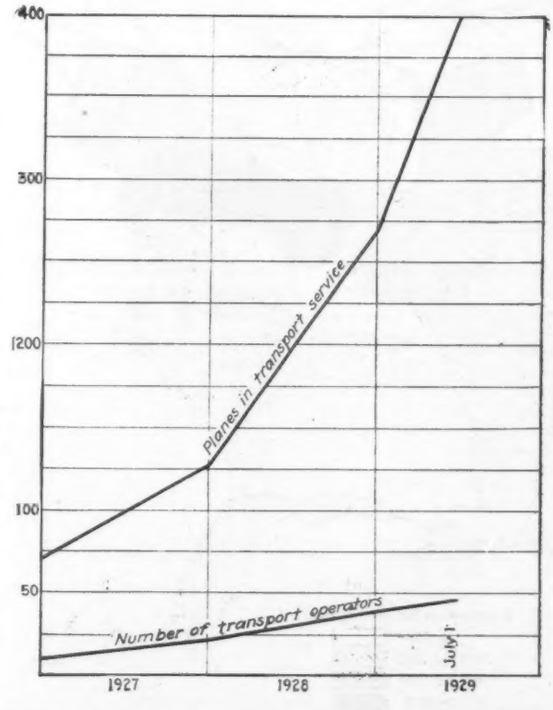
...S AND *Traffic*

fluctuating. Starting with an average of less than fifty cents per mile at the beginning of 1927, it increased to over $1.00 per mile when the rates were lowered a year ago. Since then it has remained close to that figure. Although air mail payments and subsidies are obviously two quite different things, it is interesting to note that the subsidies paid by several European governments average just about $1.00 per airplane mile, with no return in the form of excess postage.

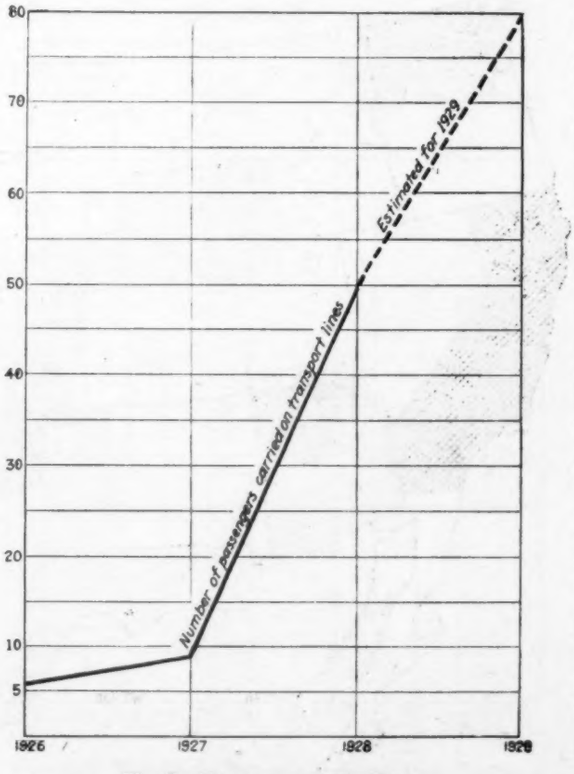
Although there are no traffic figures in ton-miles and passenger-miles available for American operations, a general analysis of the transport business can be made in terms of passengers carried and pounds of mail. The express business has so far not been large enough to cut an important figure in the distribution. The number of passengers in 1926 was 6,000, an aggregate weight of about 1,100,000 pounds as against 703,000 pounds of air mail. As the length of voyage for an average passenger probably was not more than one-eighth of that for the average letter, the actual traffic in that year was probably about sixteen per cent passenger, 84 per cent mail. On the same basis of calculation the proportion of passenger business fell back to about twelve per cent in 1927, increased to approximately one-fourth of the total air transport business in 1928, and seems likely to be at least as large a part of the total for the present year.



10 Years of Air Mail Progress



Total of Transport Operators and Equipment



U. S. Passenger Traffic
(Scale in thousands of passengers)

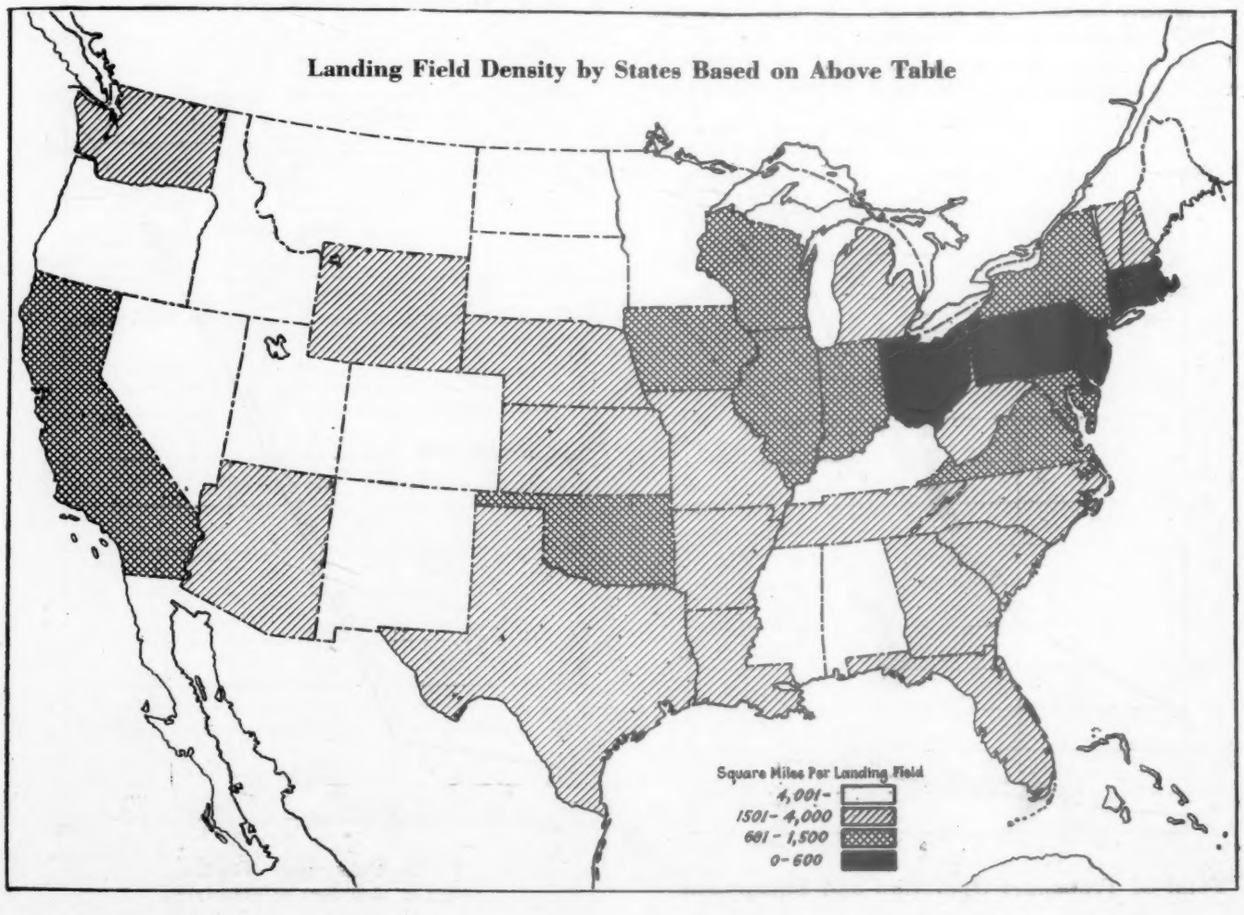
Airport AND Landing Field D

Airports (June 30, 1929)

STATE	Municipal	Commercial	Private	Auxiliary	D.C. Lighted Inter.	Lighted	Army and Air Corps	Navy	TOTAL	Sq. Mi. per Airport
Alabama	2	4	..	..	4	..	2	..	12	4,330
Arizona	23	4	..	9	..	2	1	..	37	3,090
Arkansas	3	5	..	6	..	2	1	..	15	3,550
California	53	42	..	23	16	19	6	3	143	1,110
Colorado	9	6	..	3	6	5	1	..	25	4,160
Connecticut	4	1	..	4	1	2	..	..	10	497
Delaware	..	1	1	4	..	1	..	..	6	325
Dist. of Columbia	..	3	..	..	..	3	1	1	5	14
Florida	15	12	..	8	..	2	1	3	39	1,505
Georgia	11	2	..	1	5	2	2	..	21	2,810
Idaho	3	..	..	2	2	1	..	..	7	11,984
Illinois	8	35	..	8	14	11	2	1	68	835
Indiana	8	15	..	3	10	2	1	..	37	981
Iowa	9	15	..	1	15	6	1	..	41	1,370
Kansas	15	9	..	1	6	2	2	..	33	2,490
Kentucky	3	4	..	..	2	1	..	..	9	4,511
Louisiana	6	5	..	2	..	3	1	..	15	3,240
Maine	2	2	..	1	..	1	..	..	5	6,000
Maryland	1	4	..	7	..	2	3	..	15	663
Massachusetts	3	12	1	3	2	2	1	..	22	375
Michigan	19	9	..	7	1	5	2	..	38	1,525
Minnesota	5	7	..	4	3	2	..	..	19	4,460
Mississippi	1	4	..	2	..	..	..	..	7	6,695
Missouri	9	6	..	2	2	6	..	..	19	3,620
Montana	7	5	..	6	1	1	..	..	19	7,700
Nebraska	5	6	..	3	13	3	1	..	28	2,750
Nevada	9	1	..	5	3	2	..	..	18	6,310
New Hampshire	5	..	..	1	..	..	..	..	6	1,557
New Jersey	7	15	..	4	2	5	2	1	32	265
New Mexico	10	2	..	8	1	..	1	..	22	5,570
New York	13	21	..	9	1	8	4	..	48	1,025
North Carolina	9	7	..	2	6	2	1	..	25	2,100
North Dakota	5	2	..	1	..	..	..	..	8	8,855
Ohio	13	27	..	10	20	12	3	..	73	562
Oklahoma	10	14	..	16	8	2	1	..	49	1,430
Oregon	11	4	..	6	3	2	..	..	24	4,025
Pennsylvania	15	33	..	15	24	6	1	1	89	507
Rhode Island	..	4	..	4	..	..	..	..	8	156
South Carolina	3	4	..	3	4	1	1	..	15	2,060
South Dakota	6	7	..	3	..	..	..	..	16	4,850
Tennessee	5	3	..	3	..	1	..	..	11	3,820
Texas	30	14	1	34	2	8	15	..	98	2,660
Utah	3	..	..	4	2	1	..	..	9	9,440
Vermont	2	2	..	5	..	..	..	..	9	1,075
Virginia	3	10	..	3	8	3	4	2	31	6,337
Washington	10	7	..	8	..	3	2	1	28	2,460
West Virginia	2	3	..	5	..	..	..	..	10	2,413
Wisconsin	13	19	..	1	8	5	..	..	41	1,366
Wyoming	6	2	..	2	16	2	..	..	26	3,760
Grand total									1,377	2,220

Above table does not include 1 Dept. Agr., 1 Coast Guard, 2 Nat. Guards and 1 Marine Corps airports.

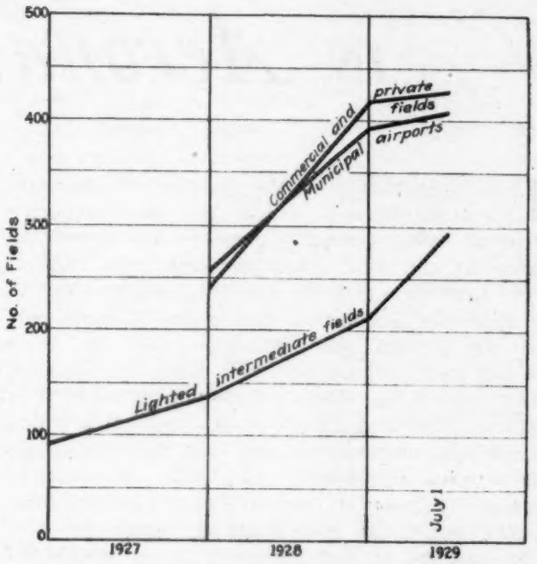
Number of Airports in Column marked "Lighted" is included in the other columns and is not additional.



DISTRIBUTION IN THE UNITED STATES

IN EXAMINING the map on the opposite page, it is of course apparent that landing fields are established as such most frequently, other things being equal, where there are fewest possibilities of landing upon a natural terrain. In New England, for example, artificially prepared and marked landing fields are relatively much more necessary for safe flying than in the prairie states. In any case, however, the standard of six hundred square miles per landing field seems a modest one to aim at. To have a landing field always within ten miles wherever a plane might be flying, as has recently been urged by a number of authorities, would require at least one field for every two hundred square miles of area, a density so far attained only in the District of Columbia and in the smallest state in the Union.

In states where popular interest has been particularly great, and where the habit of municipal business enterprise is established, as in many parts of the West, the municipal fields far outnumber the commercial ones. In several northeastern states, on the other hand, commercial fields outnumber those provided by the government in the ratio of two to one or more.



Total of Airports and Dept. of Commerce Fields Established

WORK OF
National Advisory Committee
FOR AERONAUTICS

APPROPRIATIONS AND PERSONNEL OF NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS, AUGUST 31, 1929

Fiscal Year	Total Appropriations	Employees at Langley Field Laboratories
1923	225,600.00	53
1924	307,000.00	77
1925	470,000.00	107
1926	534,000.00	121
1927	513,000.00	141
1928	550,000.00	156
1929	628,770.00	177
1930	*1,508,000.00	197

*Material increased provides for construction of full scale wind tunnel, seaplane channel, and heating plant.

PUBLICATIONS OF NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS, AUGUST 31, 1929

	Technical Reports	Technical Notes	Technical Memorandums	Aircraft Circulars	Total Copies Distributed
1923	21	51	67	..	36,870
1924	23	37	52	..	37,209
1925	22	19	49	..	35,884
1926	27	24	47	26	39,207
1927	28	17	52	38	55,636
1928	20	30	50	23	70,663
1929	*21	*14	*36	*13	*94,370

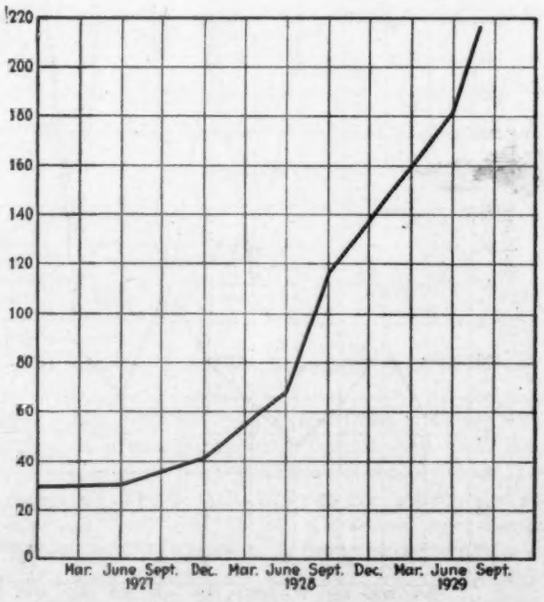
	Technical Reports: Originating with N.A.C.A.	Technical Reports: All Other Sources	Technical Notes: Originating with N.A.C.A.	Technical Notes: All Other Sources
1923	8	13	11	40
1924	10	13	15	22
1925	8	14	12	7
1926	14	13	19	5
1927	17	11	10	7
1928	15	5	20	11
1929	*12	*5	*7	*7

*To date.

Weather Bureau

Specific Appropriations for Weather Service on Civil Airways

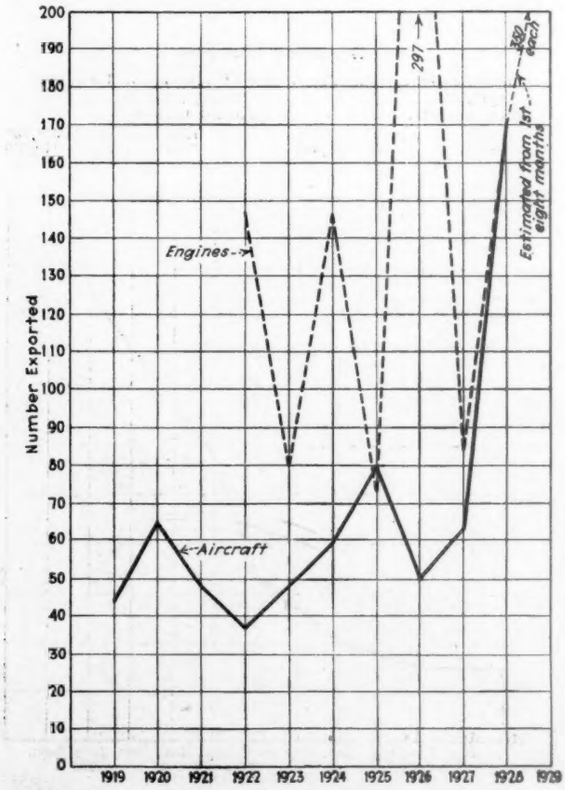
Fiscal Year Ending June 30		Fiscal Year Ending June 30	
1927	$75,000	1929	243,500
1928	120,000	1930	710,000



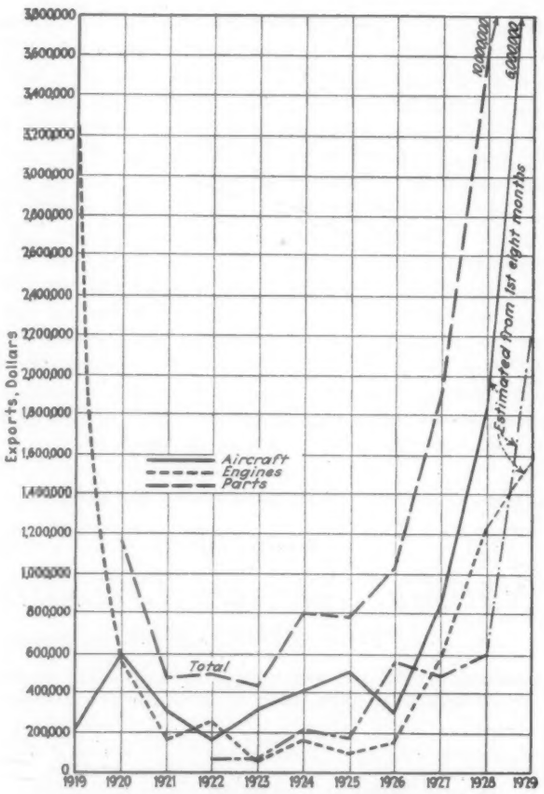
Special Weather Bureau Observing Stations Operating for Airway Service

AMERICAN EXPORT TRADE IN *Aeronautical Equipment*

THE PROPORTION of the product of the American aircraft industry which has been exported has been increasing gradually over the last three years, as shown by the chart given herewith. In 1927 a trifle over three per cent of the production went abroad. In 1928 the proportion had risen to four per cent, and the present year it seems likely to be nearly ten per cent. Prior to 1927, when but little serious effort was being made to develop permanent export markets, the foreign trade in aeronautical products was exceedingly unstabilized, and was made up largely of war surplus equipment. In 1922, for example, the average valuation of the airplanes exported was only $5,000, while the corresponding figure for the first eight months of the present year is about $17,000. The influence of war surpluses is particularly evident in the irregularity of the curve of engine exports and in the low average value. For the 297 engines shipped abroad in 1926 it was only $3,000 per unit. In 1927 the average valuation on engines exported had increased to about $6,000. Since then it has again been falling, in correspondence with the decrease of domestic

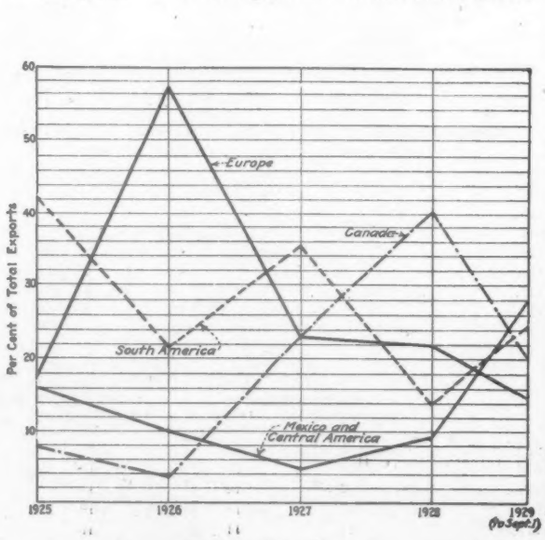


Number of Aircraft and Engines Shipped Abroad Each Year



Total Value of Aeronautical Exports

Note: The curves for engines and parts are interchanged on the legend. It is the engine curve which starts in 1922



Percentage Distribution of Exports by Geographical Areas

Aircraft and Aircraft Engine Exports (Value in Dollars)

(Aircraft parts included only in 1927 and 1928)

Countries	1922	1923	1924	1925	1926	1927	1928	Total 1925–1928
Canada and Newfoundland	**2,230**	**6,015**	**22,163**	**53,302**	**23,850**	**448,475**	**1,486,852**	**2,017,569**
Cuba	500	.....	30,920	94,000	85	25,176	61,584	180,845
Dominican Republic	.....	1,102	.....	.....	.....	10,623	62	10,685
Honduras	.....	6,100	11,550	.....	.....	14,888	11,253	26,141
Mexico	20,250	5,850	228,220	5,950	80,637	34,458	236,202	357,247
Panama	.....	.....	.....	.....	.....	4,824	22,865	27,689
Salvador	.....	5,802	6,100	9,000	4,188	.....	.....	13,188
Mexico and Central America (including miscellaneous)	**20,750**	**21,356**	**277,165**	**109,950**	**86,910**	**90,381**	**336,406**	**623,647**
Argentina	.....	30,639	66,184	191,380	29,373	19,399	93,866	334,018
Brazil	108,700	229,200	60,273	64,475	50	17,899	116,151	198,575
Chile	.....	8,210	12,682	.....	45,000	222,448	17,343	284,791
Columbia	.....	.....	1,334	33,879	4,605	67,904	29,144	135,532
Peru	.....	10,317	68,461	.....	109,210	343,217	249,821	702,240
Venezuela	.....	.....	.....	.....	5,525	365	.....	5,898
South America (including miscellaneous)	**113,700**	**278,366**	**208,944**	**289,734**	**193,763**	**671,232**	**507,013**	**1,661,743**
Belgium	.....	400	.....	7,000	.....	99,103	4,183	110,686
Czechoslovakia	.....	.....	.....	.....	.....	4,848	3,890	8,738
Denmark	.....	.....	.....	.....	.....	120	19,345	19,465
France	.....	1,450	14,100	.....	.....	5,475	7,526	13,001
Germany	.....	.....	11,000	70,558	9,639	80,369	208,558	369,124
Italy	.....	1,600	22,716	.....	.....	3,498	99,834	103,332
Netherlands	.....	55,239	71,628	14,682	.....	19,977	90,600	125,259
Norway	3,000	.....	26,000	.....	.....	2,080	1,925	4,005
Poland and Danzig	.....	.....	.....	.....	.....	4,260	8,149	12,409
Soviet Russia in Europe	.....	.....	8,600	.....	223,068	175,528	142,772	541,368
Spain	.....	.....	.....	.....	.....	4,100	19,051	23,151
Sweden	.....	.....	.....	38,996	6,951	.....	15,021	60,968
United Kingdom	.....	.....	79,800	.....	264,698	42,717	157,497	464,912
Europe (including miscellaneous)	**3,000**	**58,689**	**233,844**	**131,236**	**504,356**	**442,075**	**802,830**	**1,880,497**
China	17,600	.....	4,590	.....	.....	47,857	180,853	228,710
Hongkong	.....	10,000	.....	.....	.....	.....	2,182	2,182
Japan	.....	.....	46,597	.....	600	77,819	133,531	211,950
Siam	.....	.....	1,497	1,200	16,000	38,000	39,501	94,701
Asia (including miscellaneous)	**17,600**	**10,000**	**52,684**	**1,200**	**46,118**	**205,262**	**356,067**	**608,647**
Total (including miscellaneous)	**157,280**	**374,609**	**796,273**	**682,075**	**888,600**	**1,903,560**	**3,651,032**	**7,125,267**

engine prices due to enlarged production, and the average for the first eight months of 1929 was only a little over $4,000 per power plant.

Since the total exports are still so small that a single large order may greatly effect their percentage distribution, their allocation among the continents is still highly variable from year to year. The curves drawn over the last five years make evident, however, the gradually increasing importance of the American market and the decrease in relative significance of the exports to Europe. In each of the last two years more than two-thirds of the total exports (in dollars) have gone to the western hemisphere. Rapidly increasing shipments to Mexico are primarily responsible for the increasing relative importance of the group that includes that country and Central America.

The figures for the first eight months of 1929 have been included in the charts, but they were received too late for complete analysis for the table of exports by countries. The exports to Mexico alone between January 1 and September 1 aggregated $1,560,071, almost as much as the entire export trade in aircraft with the whole world for the year 1927. Other conspicuously large consumers of American aircraft products in the first eight months of 1929 were Chile, which took $690,225, mostly in complete airplanes, and Japan. The exports to Japan for the past eight months exceeded the total of trade with that country for the previous seven years. While the Canadian business amounted to more than one and a half million dollars, and for the whole year is almost sure to be above the previous record figures of 1928, the proportion of the total business done with Canada has sharply decreased.

A substantial proportion of the exports to the countries of the western hemisphere is accounted for by the shipment of planes, later to be operated by transport lines under American management.

National Aeronautical Association Activities

(To September 1, 1929)

	1925	1926	1927	1928	1929
Membership at end of year (approx.)	5,100	4,800	5,660	7,200	8,237[1]
Chapters formed up to end of year	....	71	98	158	184[1]
No. of F.A.I. certificates issued during year	175	209	200	242	265[2]
No. of N.A.A. sporting licenses issued	427	539	394	559	501[2]
No. of race meets sanctioned	....	10	11	16	25[3]
No. of air tours sanctioned	....	1	1	1	5

[1] As of September 1, 1929; [2] to September 5, 1929; [3] to September 16, 1929.

The F.A.I. license referred to in the table of N.A.A. activities is granted once and for all, and each license represents a new pilot potentially qualified for aerial competition. The N.A.A. licenses are annual, and must be renewed each year by all pilots wishing to engage in contests. The number of meets sanctioned in each year is a fair measure of the total amount of serious competition, as licensed pilots are only permitted to compete in sanctioned events.

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AMERICAN Military AND Naval DEVELOPMENT

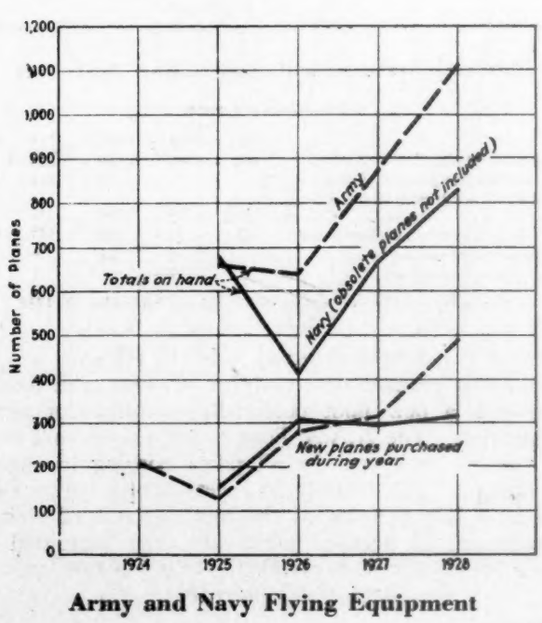
Army Air Corps

Personnel strength at end of year	1922	1923	1924	1925	1926	1927	1928
Officers	890	928	960	944	969	1,019	1,086
Enlisted men	8,350	10,143	8,530	8,972	8,256	9,275	10,311
Qualified pilots (commissioned and enlisted)	829	903	925	833	884	932	957
No. of planes in use Dec. 31	....	....	1,592	657	647	868	1,111
Reserve officers enrolled and qualified as pilots	....	....	....	....	4,692	3,699	3,545
Flying hours	65,214	65,750	97,834	150,319	158,402	140,909	182,903
Airplanes purchased (during fiscal year)	182	83	210	127	276	315	491

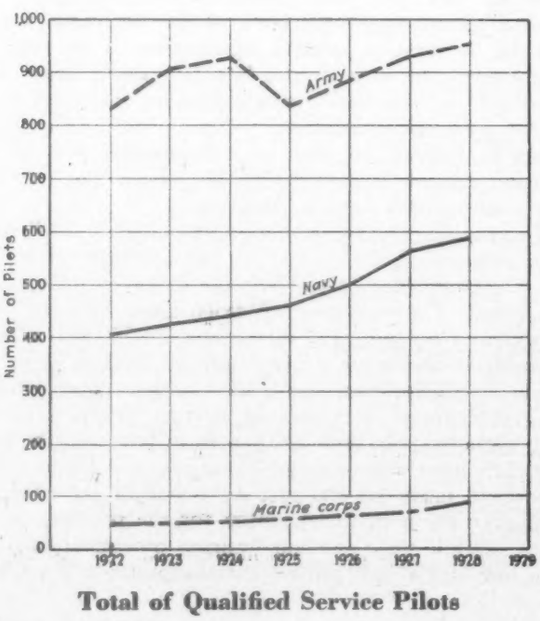
Naval Aeronautics

Naval and Marine Corps flying personnel at end of fiscal year	1922	1923	1924	1925	1926	1927	1928
Naval officer pilots	314	326	328	365	411	457	446
Naval enlisted pilots	91	102	112	98	91	108	141
Total Naval pilots	405	428	440	463	502	565	587
Marine Corps officer pilots	46	48	43	45	43	55	61
Marine Corps enlisted pilots	....	....	6	12	16	14	27
Total Marine Corps pilots	46	48	49	57	59	69	88
Hours' flying during fiscal year	39,808	52,586	59,907	63,791	83,228	103,391	137,289
No. of airplanes on hand at end of year[1]	....	616	761	752	837	807	946
No. of non-obsolete airplanes on hand[1]	....	....	258[2]	677	411	662	834
No. of planes purchased during fiscal year	....	....	....	150	302	297	313

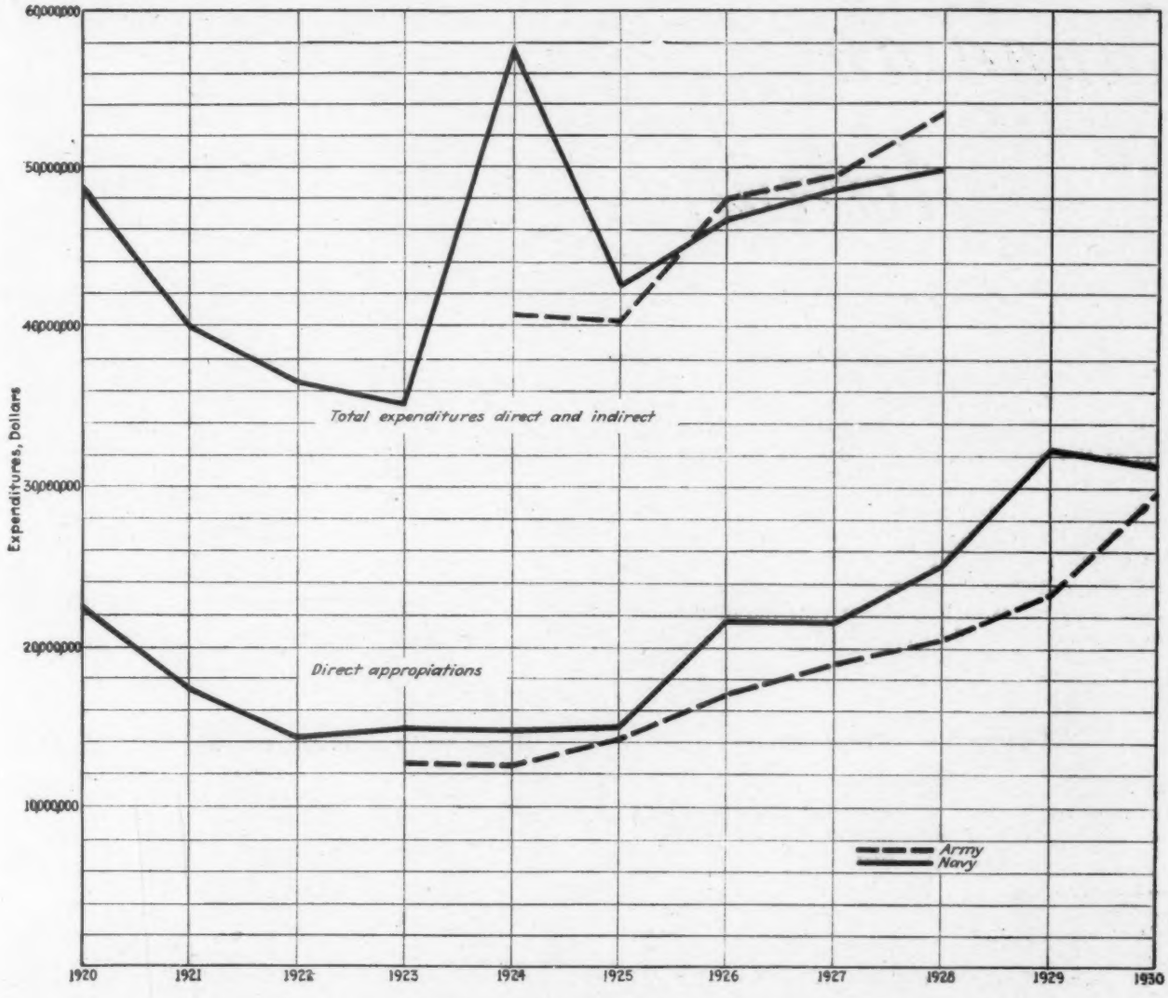
[1]Actual date for these figures ranges from October 1 to December 31. [2]Obsolescent as well as obsolete types excluded from this total.



Army and Navy Flying Equipment



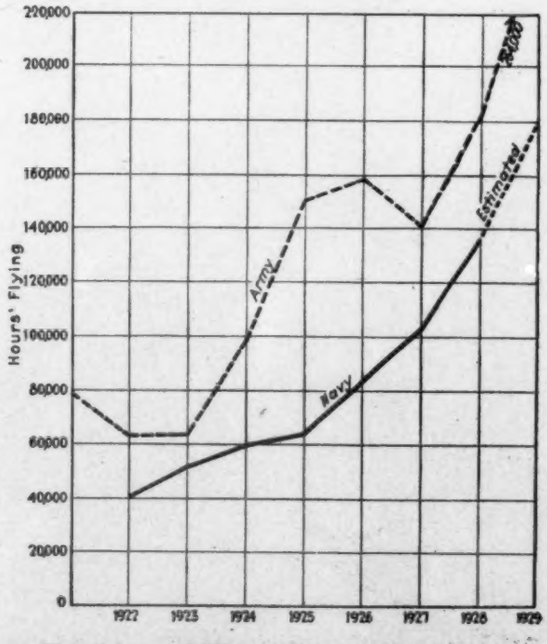
Total of Qualified Service Pilots



Aeronautical Appropriations

THE CHART of Army and Navy appropriations does not correspond to the actual outlay from the appropriations of the several years. To give the figures in those terms would be misleading, as both services have at times been specifically authorized to issue contracts in excess of current appropriations and charge the obligations against future years. The sums allotted are, as nearly as they could be determined, those newly available for obligation in each fiscal year. The exact allocation is in some cases a little vague, as legislative authorization to spend the next year's money has not always been used to its full extent, but they represent better than any other statistics that could be secured the rate at which the Congress has actually sought to permit the aerial operations of the Army and Navy to proceed.

The indirect expenditures include the pay of officers and men and all other items directly related to aeronautics. The peak in the Navy figure for 1924, for example, represents construction costs on the aircraft-carrying ships Saratoga and Lexington. These figures also include the book value of transfers of war surplus stores to current use. The general advance in appropriations and in activities which began with the meetings of the President's aircraft board in 1925 and the passage of the five-year aircraft programs in the following year is evident in the charts.

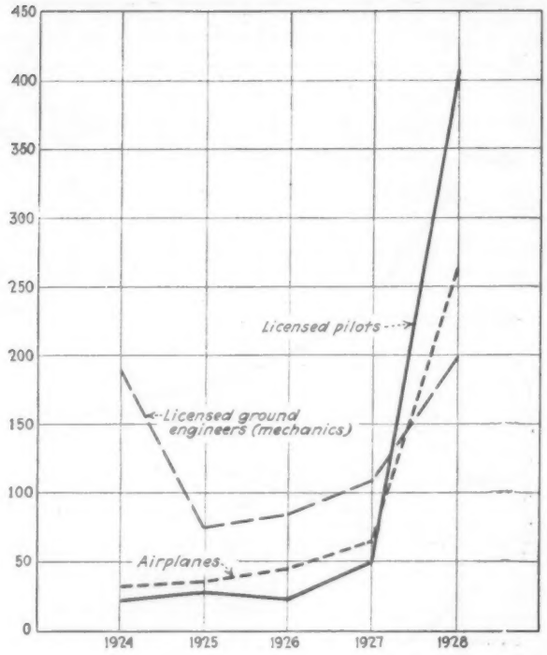


Total Annual Flying Time in Airplanes

Canadian Activities

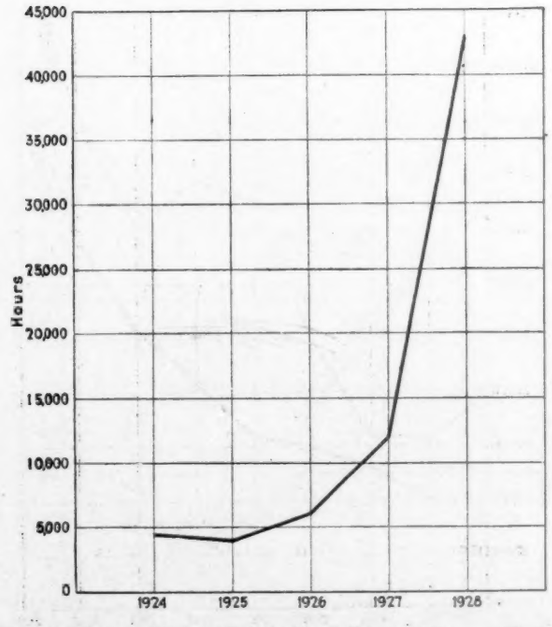
CANADIAN OPERATIONS are closely linked with those both of the United States and of Great Britain. The enormous recent expansion is in part the parallel for that recorded in the United States, in part the result of starting light plane clubs on the British model. A little less than 60 per cent of the airplanes registered in Canada at the end of last year were constructed in the United States.

Specifically, the sudden increase in flying time and in number of pilots during 1928 is about half due to the light plane club work. The clubs had a little over 8,000 hours of flying during the year, and qualified one hundred and thirty-nine pilots. During that year the total number of private pilots licensed increased from nine to 154.



Commercial Operations

	1924	1925	1926	1927	1928
Firms operating aircraft	.....	.....	2	2	4
Passengers carried	5,314	4,897	6,436	18,932	74,669
Freight or express (lb.)	77,385	592,220	724,721	1,098,348	2,404,682
Mail (lb.)	1,221	1,080	3,960	14,684	316,631
Hours flown	4,389	4,091	5,860	12,070	43,071
Miles of transport routes	.....	.....	.....	372	1,692
Airplane mileage	.....	.....	30,290	209,583	1,557,917
Seaplane mileage	.....	.....	356,481	619,427	1,150,156
Amphibion mileage	.....	.....	6,332	.....	20,341
Total miles flown	294,778	255,826	393,103	829,010	2,728,414



Total Flying Time, Including Light Plane Clubs

Registered Canadian Aircraft, Dec. 31, 1928

Make	Private	Commercial	State	Club Instruction
DeHavilland, D.H. 60X Moth, D.H. 61, and Gipsy Moth	11	32	11	31
Curtiss—JN-4, Lark and Canuck	1	17	...	...
Fokker	...	23	5	...
Waco Nine and Ten	...	7	...	...
Aero Avian	1	8	...	...
Fairchild F.C.2	...	31	1	...
H.S. 2 L. Flying Boat	...	8	11	...
Schreck F.B.A.	...	8	...	...
Swallow	...	10	...	...
Miscellaneous	4	43	1	...
Totals	17	187	29	31
				264

The miscellaneous were: American, 43; British, 5.

Aircraft Production

Three Canadian firms were engaged in manufacturing aircraft during 1928. Canadian Vickers, Ltd., produced 21 machines, including nine Vedette flying boats. DeHavilland Aircraft of Canada, Ltd., produced 62 Moth, Gipsy Moth and DH. 61 planes. Reid Aircraft Company, Ltd., which has since consolidated with Curtiss Aeroplane & Motor Company (U. S.) and is now operating under the name of Curtiss-Reid Aircraft Company, Ltd., did not report production figures for the year.

Licenses and Certificates

	1924	1925	1926	1927	1928
Licensed airplanes	.....	.....	15	29	107
Licensed seaplanes	.....	.....	28	31	121
Licensed amphibions	.....	.....	1	...	4
Licensed convertible	.....	.....	...	7	32
Total licensed aircraft	32	34	44	67	264
Licensed pilots	22	27	23	49	404
Licensed pilot-mechanics	.....	.....	18	29	70
Licensed mechanics	.....	.....	65	74	130

Airports

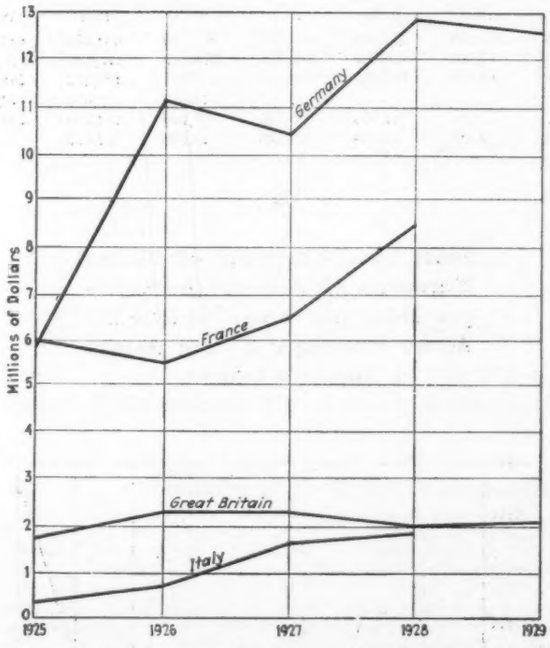
Land airports	.....	.....	14	17	32
Seaplane stations	.....	.....	19	19	12
Total airports	23	24	33	36	44

AERONAUTICAL EXPENDITURES OF *Foreign Governments*

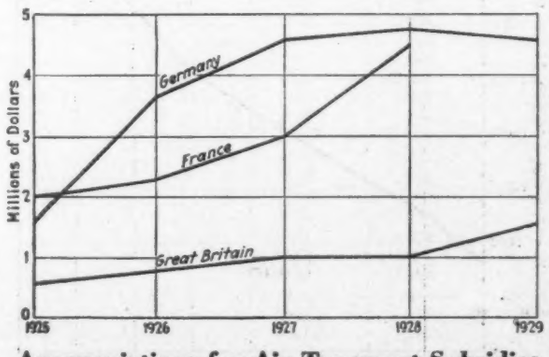
European Aeronautical Budgets

(All figures given in dollars.)

	1925	1926	1927	1928	1929
FRANCE					
Military	.....	.....	.....	24,100,000	.....
Naval	.....	.....	.....	8,180,000	.....
Civil aviation, total	5,950,000	5,560,000	6,590,000	8,510,000	.....
Air transport subsidies	2,015,000	2,360,000	3,067,000	4,480,000	.....
GERMANY, TOTAL	5,750,000	11,150,000	10,430,000	12,920,000	12,600,000
Air transport subsidies	1,595,000	3,708,000	4,700,000	4,760,000	4,590,000
GREAT BRITAIN					
Military	73,700,000	75,600,000	73,400,000	77,000,000	76,600,000
Civil aviation, total	1,735,000	2,245,000	2,255,000	2,020,000	2,188,000
Air transport subsidies	666,000	812,000	1,121,000	1,119,000	1,697,000
Light airplane clubs	27,200	44,000	79,800	77,800	77,800
ITALY, TOTAL	24,800,000	29,160,000	36,520,000	36,520,000	36,500,000
Civil aviation	365,000	721,000	1,620,000	1,870,000	.....



Total Appropriations for Civil Aeronautics



Appropriations for Air Transport Subsidies

IN CONVERTING European currency into dollars, the present exchange value of the European unit has in all cases been used. For most of the countries concerned there has been but little fluctuation in the exchange over the period covered by the table, which begins after the end of the great wave of currency deflation.

No attempt has been made to convert the figures to a basis of equal purchasing power. Their adjustment to represent the purchasing power of the appropriations at American price levels would require a relatively small increase in the sums for Great Britain and Germany, a much larger increase for France and Italy.

Such adjustments are unimportant, however, and no time need be spent on discussing them, as the figures would, in any case, need the most elaborate analysis and explanation before those for the various countries would be mutually comparable. The table and the graphs which accompany it are useful rather as a means of showing tendencies from year to year in a given appropriation. Comparison of foreign budgets to that of the United States is quite impossible, for example, because the direct appropriation for Naval and Military aviation in this country does not include the pay of officers and men, items that do enter into the direct aeronautical budget for most European countries. Their pay may be included on a comparatively liberal scale, as in Great Britain, or it may be purely nominal, as in the countries where conscription for the military services prevails.

The figures for Germany are on quite a different plane from those for other countries. Since the German republic has no military air force, general expenditures for development of ground facilities and especially for research, which would be a charge against military appropriation elsewhere, have to go under civil headings for that country. Another difference not covered in the table is found in the granting of direct and indirect subsidies to air transport lines in Germany by numerous states and municipalities. The figures given here are only those for the Federal Government.

Annual Airplane Mileage in Air Transport

(Thousands omitted.)

	1920	1921	1922	1923	1924	1925	1926	1927	1928
Australia	...	.....	.....	.....	263	358	417	344	412
Belgium	...	.....	.....	.....	.....	.....	90	111	230
Colombia	...	54	128	184	168	182	302	328	577
Czechoslovakia	...	.....	.....	.....	129	173	152	258	257
Denmark	...	.....	.....	.....	.....	127	127	117	103
Finland	...	.....	.....	.....	.....	32	58	105	163
France	530	1,461	1,738	2,104	2,264	2,928	3,240	3,751	4,345
Germany	298	1,028	748	448	984	3,076	3,900	6,190	6,345
Great Britain	644	225	717	943	936	862	840	873	1,024
Italy	...	.....	.....	.....	.....	.....	325	815	1,236
The Netherlands	...	.....	.....	.....	448	640	530	720	1,008
Poland	...	.....	.....	.....	.....	.....	532	672	260
Russia	...	.....	83	158	312	555	815	1,127	1,684
Sweden	...	.....	.....	.....	100	216	212	204	200
United States	...	.....	.....	.....	.....	.....	4,420	5,810	7,300

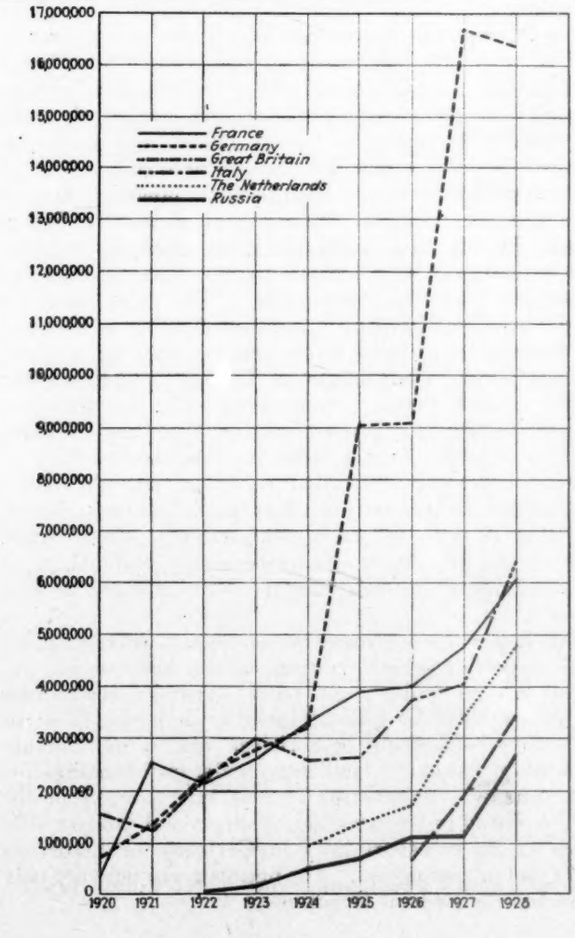
Passenger Traffic in Passenger-Miles

(Thousands omitted)

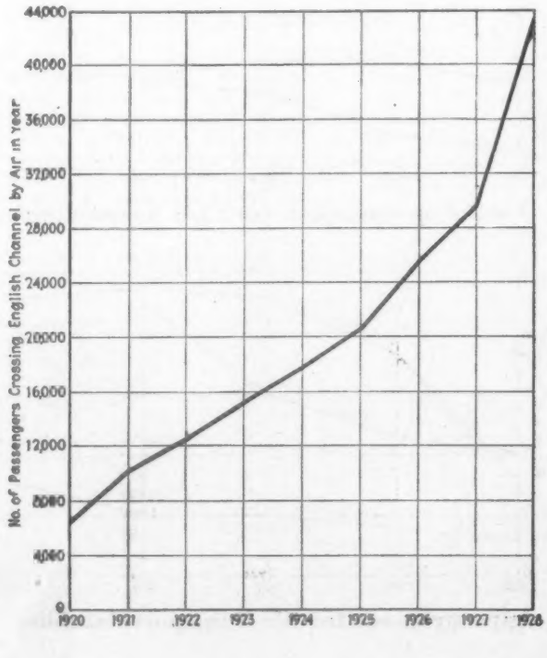
	1920	1921	1922	1923	1924	1925	1926	1927	1928
France	382	2,562	2,165	2,600	3,338	3,895	4,090	4,795	6,160
Germany	795	1,360	2,310	2,770	3,221	9,050	9,090	16,720	16,420
Great Britain	1,305	1,270	2,220	3,010	2,620	2,645	3,746	4,028	6,380
Italy	.....	.....	.....	.....	.....	.....	657	1,997	3,485
The Netherlands	.....	.....	.....	.....	967	1,350	1,700	3,400	4,800
Russia	.....	.....	83	185	510	750	1,150	1,170	2,690

Express and Mail Traffic in Ton-Miles

	1920	1921	1922	1923	1924	1925	1926	1927	1928
France	24,980	84,100	192,300	284,500	337,500	405,000	389,300	431,000	639,000
Germany	2,700	600	22,500	15,000	24,400	280,000	217,400	476,000	559,000
Great Britain	30,900	4,400	42,500	64,300	104,200	147,567	159,031	135,882	246,500
Italy	.....	.....	.....	.....	.....	.....	10,500	36,000	70,000
The Netherlands	.....	.....	.....	.....	42,000	56,000	96,000	154,000	200,000
Russia	.....	.....	4,600	8,400	13,300	25,600	28,000	57,000	76,000

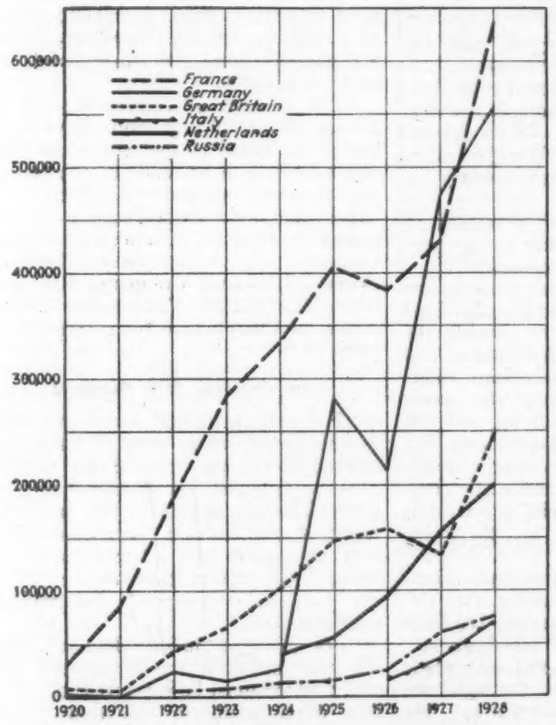


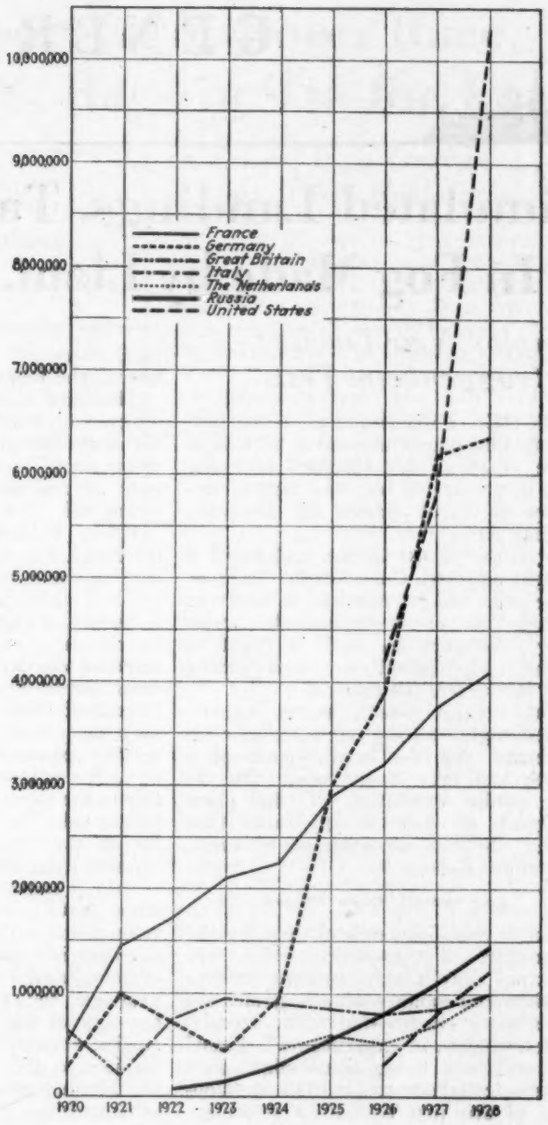
Left: Total Passenger Traffic on European Air Services in Passenger Miles per Year. Below: Aerial Passenger Traffic Across English Channel.



Foreign

AIR TRANSPORT





Above: Express and Mail Traffic in Ten Miles.
Right: Total mileage Flown in Air Transport.

Statistics of Civil Air Transportation (from the Department of Commerce)

Country	Year	Miles of Air Lines in Operation	Passengers Carried (Regular Service)	Lb. of Mail and Express Carried (Regular Service)	Number of Aircraft Employed in Regular Service	Total Number of Civil Aircraft	Estimated Production of Civil Aircraft
Australia	1927	3,605	28,962	141,755	34	120	....
Austria	1928	1,137	5,477	229,821	9	30	....
Belgium	1928	370	1,543	40,516	10	14	....
Belgian Congo	1928	2,195	735	124,822	33	....	....
Bolivia	1928	2,130	2,963	128,671	8	8	....
Canada	1928	1,654	74,689	2,721,313	....	327	....
Columbia	1928	1,774	2,667	530,413	15	47	....
Czechoslovakia	1928	1,379	10,965	391,145	31	141	....
Denmark	1928	484	1,602	89,387	4	....	....
Finland	1928	268	3,201	104,431	4	9	....
France	1927	14,542	21,000	4,352,280	241	860	1,440[1]
Germany	1928	18,540	115,000	5,412,000	190	535	352
Great Britain	1927	2,322	19,935	1,316,544	15	353	204
Hungary	1927	373	2,293	109,251	8	....	....
Italy	1928	5,150	15,590	549,025	56	1,000	475[1]
Japan	1928	1,328	270	139	26	108	....
Mexico	1928	1,548	5,089	108,329	19	83	....
Netherlands	1928	2,092	17,165	1,645,654	23	30	....
Persia	1927	1,095	2,600	84,537	7	....	....
Peru	1928	2,350	517	24,000	10	18	....
Poland	1928	1,231	6,585	548,395	20	24	....
Russia	1927	7,022	7,079	375,622	....	....	....
Spain	1928	730	1,027	25,617	6	....	....
Sweden	1928	711	14,948	233,361	8	....	....
Switzerland	1928	2,105	14,283	342,593	19	43	25[1]

[1] Military production included.

GENERAL NEWS

Simulated Landings, Take-Offs In Fog Made by Lieut. Doolittle

Employ New Devices In Guggenheim Tests

MITCHEL FIELD (L. I.)—The possibility that planes may soon be able to make practical safe landings in a fog was demonstrated at this airport recently by Lieut. James H. Doolittle, leading Army flier.

Doolittle, seated in the cockpit of a Wright powered, Consolidated Training plane—the cockpit enclosed in order to obscure all vision—guided his craft safely into the air, made a flight of 15 mi., and then returned to a landing near the spot of his take-off.

For several weeks, secret experimental flights testing out three new instruments and the improvement of a fourth had been made here. On the first public exhibition of the plane equipped to take-off, fly and land "blind," he was accompanied by Lieut. Benjamin Kelsey.

Use Special Radio Beacon

The Daniel Guggenheim Fund for the Promotion of Aeronautics has been working many months on these devices which would conquer what is termed the flier's worst enemy—fog. The successful termination of experiments indicated that craft and flying fields might soon be practically outfitted with a development of this new equipment at an appreciably small cost.

A system of visual radio control as well as the ordinary audible type of communication received through ear sets, was one of Doolittle's greatest aids.

A special radio beacon was installed here for that purpose as well as the long distance type already in use, and cost around $2,000, but its use on a large commercial scale would considerably lower that figure.

This beacon throws a beam of from fifteen to twenty miles in length and registers on the pilot's instrument board through two delicately adjusted reeds. They tell the pilot by vibrations one way or the other, whether he is off or on his course. By regulating his distance from the airport, Doolittle was able to work out the proper gliding distance necessary for a safe landing.

It was when nearing the ground that the new types of instruments especially helped him. One of them was a very sensitive altimeter, corrected for variations of atmospheric conditions, which gives the distance from the earth within a dozen feet or less. Another was a gyroscope which established an "artificial horizon" which gave him his lateral and longitudinal positions.

The third was a directional gyroscope which indicated his directional and also his longitudinal angles. This instrument, being very delicately adjusted, is only of real service when landing or taking off.

Harry F. Guggenheim, president of the Fund, has the following to say concerning the successful experiments:

"It is significant that the achievement is realized through the aid of only three instruments which are not already the standard equipment of an airplane. In other words, with the commercial manufacture of these instruments, the necessary equipment for fog flying will be neither expensive nor complicated, but of such a nature that it is readily available to the average pilot, and easily comprehended. The commercial practicability of the development is, therefore, assured from the start.

"Many individuals and organizations have participated in making this development possible. Lieutenant Doolittle has been in charge of the full-flight laboratory from the start, and was made available for this work through the courtesy of the Army Air Corps. He studied at both the University of California and the Massachusetts Institute of Technology, and his aeronautical achievements, including the winning of the Schneider Cup Race in 1925, rank him as one of the country's leading pilots. Professor William Brown of the Department of Aeronautics, Massachusetts Institute of Technology, was his technical assistant and for some time has been actively engaged in various phases of aviation with the Navy, the Army and the National Advisory Committee for Aeronautics.

"The Bureau of Standards and the United States Army and Navy have both contributed to the work, and mention should also be made of the following companies whose instruments and experimentations made possible the necessary equipment: Pioneer Instrument Company, Taylor Instrument Company, Sperry Gyroscope Company, Bell Laboratories, Radio Frequency Laboratories, and Kollsman Instrument Company.

Development Still Required

"The new principle which has been demonstrated solves what I have considered in the past one of the two remaining fundamental problems of aviation. The application of this principle, however, and the final perfection of the best equipment for all phases of fog flying will require time and effort on the part of commercial and military organizations.

"For example, in our demonstration, use was made of the barometric altimeter which must be corrected for variation of atmospheric conditions. This correction is made by telephonic communication from the ground to the plane. Other altimeters not subject to at-

(*Concluded on Page 724*)

Showing Covered Cockpit and Radio Antenna on Test Plane

Second Fort Worth "Aerocade" Completed

FORT WORTH (TEX.)—The second Fort Worth "Aerocade" has been completed with the return to the Municipal airport here of nearly a score of planes on an International Good Will Tour. Two stops were made in Mexico, namely, McAllen and Monterey.

On Sept. 20, the craft left here and made their first stop a few hours later at Corsicana. Other towns and cities included in the itinerary were Houston, Galveston, Corpus Christi, Harlingen, Brownsville, McAllen, Monterey, Laredo, San Antonio, Austin, Waco and then Fort Worth.

Seventy-five members of the Fort Worth Association of Commerce were passengers on this tour in the interests of commercial aviation and trade relations. The planes used were owned by Texas Air Transport, private citizens and various concerns.

A. P. Barrett, president of the Southern Air Transport, headed the delegation from this city and was assisted by Jack H. Hott, manager of the Fort Worth Association of Commerce and Hub Diggs, chairman of a special committee in charge of the trip.

Capt. Frank M. Hawks, transcontinental record holder, was flight commander. The navigators were Randolph G. Page, Texhoma Aeronautical Corporation; Reg L. Robbins, Hector Gray, Texas Air Transport; Capt. W. T. Ponder, Ponder Airplane Company; and Buddy Jones, Texas-Pacific Coal and Oil Company. The Texas Company furnished oil for the planes.

An important aid to the air caravan was a sheaf of carefully prepared maps of the twelve airports to be visited which was given to each pilot before starting. There was also included a complete schedule and description of the towns and the welcoming committees.

Major Fleet Succeeded by Bell

BUFFALO (N. Y.)—Lawrence D. Bell, vice-president and general sales manager of Consolidated Aircraft Corporation, has been appointed as general manager of the Consolidated group of aeronautical interests succeeding Maj. R. H. Fleet, president, who will retire from active management of the plant. Ray P. Whitman, formerly assistant to the general manager, will become assistant general manager. It is also announced that George Newman, vice-president and factory manager of Consolidated, will also retire from active service. Major Fleet and Mr. Newman will devote all of their time in the future to determining the policies of the corporation and its plans for future business expansion.

Add to Ford Plant Space

DETROIT (MICH.) — The enlarged Ford airplane factory at Dearborn will be ready for occupancy about December 1, according to a recent announcement.

Early Report of Balloon Race Puts U. S. Bags in Tie for First

Kepner, Van Orman Lead; Navy Follows

ST. LOUIS (MO.)—First reports on the nine balloons which left here in the Gordon Bennett International Balloon Race show two United States' entries in a seeming tie for first place. With the two leading bags attaining a distance hardly 350 mi. from the starting point, the European and American records, well over a thousand miles, went unchallenged in this year's competition.

Captain Kepner's Army bag is said to have traveled 348 mi. in its flight from here to a point near Celina, Ohio, while the "Goodyear VIII," in charge of Ward T. Van Orman, landed a few miles from Troy, Ohio, having covered an unofficial distance of 347 mi. At this writing, measurements are being made to determine the winner. Time aloft for Kepner was put at 23 hr. while that of Van Orman was said to be 26 hr.

The distances traveled by the other seven balloons, together with the number of hours in the air and landing point, are reported as follows: United States Navy, T. G. W. Settle and Lieut. Wilfred Bushnell, 315 mi. in 22 hr., near Eaton, Ohio; "Belgica," Belgium, Capt. Ernest DeMuyter and Franz Lecharlier, 230 mi., 27½ hr., Corydon, Ind.; "Lafayette," France, George Blanchet and Howard Scholle, 205 mi., 22 hr., Stinesville, Ohio; "Danmark," Denmark, Georg Schenstrom and S. A. U. Rasmussen, 190 mi., 24 hr., near Bedford, Ind.; "Barmen," Germany, Dr. Hugo Kaulen, IV., and Fritz Ebener, 175 mi., 16 hr., near Melvin, Ill.; "Stadt Essen," Germany, Erich Liemkugel and George Froebel, 170 mi., 17 hr., Catlin, Ill.; "Argentina," Argentina, D. Eduardo Bradley and Lieut. Francisco Cadaval, 160 mi., 18 hr., near Terre Haute, Ind.

Bradley and Cadaval Hurt

Bradley, "Argentina" pilot, suffered a crushed knee when thrown from his balloon in landing, and is now in the Terre Haute hospital. His aide, Cadaval, sustained bruises.

Seven of the nine bags were reported soon after they had landed, but for some time the whereabouts of the "Danmark" and "Belgica" was not known. On Monday, however, word came of the latter two.

The international race for the third Gordon Bennett trophy got under way here at 4 p.m. Sept. 27 when the first of nine balloons took the air. The other bags followed at five-minute intervals, the order of departure having been determined by lot.

Forty-five minutes before the start of the race, a pilot balloon with Capt. H. E. Honeywell in charge, went up to test air currents at various altitudes. As each bag rose, a band near it played

(Concluded on page 724)

Vizetelly Sanctions Enplane, Deplane

NEW YORK (N. Y.)—According to Frank H. Vizetelly, chief lexicographer of Funk & Wagnalls, the words "enplane" and "deplane" to signify getting into and out of an airplane, respectively, should receive sanction. "These may," he said, "be regarded as fully respectable as 'entrain' and 'detrain,' 'embark' and 'disembark.'"

Machinery Power Plants Sold

MINNEAPOLIS (MINN.)—A considerable number of orders are being received here by the Toro Manufacturing Company for the firm's power plants of 1½ hp. which are employed in the operation of various airport machinery.

All Entrants Finish First Indiana Air Tour

INDIANAPOLIS (IND.)—Thirty-five planes, ranging in size from two-seaters to a three-engined Ford, completed the first annual Indiana Air Tour, landing here Sept. 21. The planes landed on schedule at each of the twenty cities visited, and all of those entered completed the trip. The planes covered nearly 1,400 mi. apiece, and made a total of 1,470 landings and take-offs with only two minor mishaps, neither of which kept the planes from continuing the journey.

Lieut. Matt Watson, director of the tour, was assisted by H. O. Fisher and James Frenzel. H. C. Brooks, secretary-treasurer of Hoosier Airport, was chairman of the tour committee. It is estimated that between 75,000 and 100,000 people gathered at the various fields along the route to watch the planes arrive and depart.

Texas T.A.T. Becomes S.A.T.

FORT WORTH (TEX.)—The initials "T.A.T." as the abbreviated form of T.A.T. Flying Service, Inc., which has been operating lines for a year under that name, have been abandoned by this division of Southern Air Transport, Inc., a subsidiary of The Aviation Corporation. So as to conform to the name Southern Air Transport and because the service now operates in many states besides Texas, the name has been changed to S.A.T. Flying Service.

Kansas City Meet Attended by 100,000

Goebel Wins Derby Roberts Stars in Races

KANSAS CITY (MO.)—After providing nine days of thrills and amusement for an estimated 100,000 spectators, the International Air Circus and Pilots' Reunion came to a close Sept. 29. There was a full program of events every day at Fairfax Airport, in addition to the Exposition which was also held at the field.

Perhaps the greatest feature of the races was the flying of the new Travel Air low-wing which so interested the industry at the National Air Races at Cleveland. On Monday and Tuesday, Sept. 23 and 24, the fast New Whirlwind Nine powered monoplane is unofficially reported to have attained speeds well over 200 m.p.h.

Friday, the planes in the race from Mexico City landed at the airport. Col. Art C. Goebel, winner of the Dole race to Hawaii, was declared the unofficial winner pending the checking of official records. It seemed probable that his time would be at least 24 hr. less than that of his nearest rival. Col. Roberto Fierro, aide to the chief of the Mexican Air Service, apparently led the four Mexican Army fliers who were the other participants. Goebel piloted the same Travel Air biplane used by Art Wells in winning the Seattle to Cleveland Derby. The first prize in the race from Mexico City was $3,000, and the total prizes more than $4.000. Fierro landed only a few minutes behind Goebel here, and both fliers were given a great reception.

Monocoupes Place High

An aerobatic team composed of Vern Roberts and R. T. Quimby, took most of the racing honors at the Circus and Reunion. They each flew Monocoupe cabin monoplanes. In ten races, Roberts won five firsts, four seconds, and one third. Quimby placed second in one race and third in another. While not racing, these pilots interested the crowds with their display flying.

Colonel Fierro used Earl Rowland's old plane in the derby. He was lost for 24 hrs. at the start, but he found a safe landing in the mountains of Mexico and was able to resume his flight and come in second. The third fliers to arrive was Capt. Luis Verdeja in a Waco biplane, purchased by the Mexican government during the recent revolution. Capt. Feliciano Flores, in a silvery Azcarate biplane, was the last to arrive but there was only a few minutes difference in the landing time of the first and last planes.

Another high mark was the arrival Wednesday of the Goodyear-Zeppelin dirigible "Vigilant." The dirigible arrived over Kansas City early in the afternoon, two hours ahead of schedule. It made several trips over the city before departing for St. Louis to be present at the start of the balloon races there.

In the 25-mi. race for women, staged Friday, Miss Mildred Kauffman of Kansas City was the winner. A squadron of planes from the Army base at Fort Riley, Kan., participated in the events at the Circus, under command of Major Goolrich.

Heavy traffic all during the week was reported by the various airlines into Kansas City, and thousands of passengers took rides in the taxi and sightseeing planes operating from the airport.

A Flying Fireman —Believe it or Not

EVANSVILLE (IND.)—By piloting his plane between a burning granary and house, at a spot several miles from this city, an aviator is reported to have kept the flames from reaching the latter building by setting up air currents tending to direct the fire away.

The pilot is said to have flown back and forth more than a score of times until no danger existed of the flames reaching the house. He then flew away without revealing his identity to Walter Schiffer, owner of the place.

Neighbors assisting in the removal of furniture were startled at the performance of the "flying fireman" and dropped the household goods to watch.

Travel Airs to South America

WICHITA (KAN.)—Two three-place biplanes carrying Wright J-5 power have just been shipped from the Travel Air factory for delivery to the Government of Ecuador. The planes will be used for military training purposes. Another plane of like design was shipped to Lima, Peru, to be used to dust crops, and a fourth went to the Isthmian Airways of Cristobal, C. Z. It will be equipped with pontoons and used for training purposes. The Aero Export Company of Wichita, of which Carlos Rodrigues is manager, handled the sales.

Firestone Air Tour in East

BOSTON (MASS.) — Officials of the Providence and New Bedford branches of Firestone Tire & Rubber Company recently made an airplane tour of New England in a Ford tri-engined plane. They flew to Boston, Portland, Worcester, and other centers, visting the Firestone employees there and entertaining them with flights over their cities.

Metal Aircraft Firm Sold to R. H. Shryver

CINCINNATI (OHIO)—Sale of Metal Aircraft Corporation, Cincinnati, for an undisclosed sum, to Robert H. Shryver, Columbus, Ohio, former president of the Citizens' Savings Bank & Trust Company of the latter city, was made and ratified at a meeting of stockholders, Sept. 23.

Shryver announced that the company would continue manufacture and sale of "Flamingo" all-metal planes, product of the corporation, in the company's Cincinnati plant at Lunken Airport. It is understood that Cincinnatians having substantial interests in the venture will continue to hold them.

Shryver's son, Daniel A. Shryver, assistant manager of Embry-Riddle Company, Cincinnati flying field operators is to become a vice-president of the manufacturing company, and Thomas E. Halpin, vice-president and general manager of the Metal corporation, will remain with the firm. There will be no other changes for the present.

There is a possibility of Metal Aircraft Corporation taking over the Mason and Dixon Air Lines and later merging with the Johnson Airplane and Supply Company, Dayton, Ohio, it is said.

Metal Aircraft Corporation was incorporated May 2, 1928, incorporators being John D. Hollister, attorney; Ralph Graichen, T. Higbee Embry, Thomas E. Halpin and J. C. Herman, all of Cincinnati. Henry Yeiser, Jr. was named president; Halpin, vice-president and general manager, Hollister, secretary, and Halpin treasurer. The firm was incorporated with $600,000 authorized capital. It erected a $100,000 brick factory at the Lunken airport.

Six More Planes Approved

WASHINGTON (D. C.) — Approved type certificates have been issued to six more airplanes. According to certificate, make and designation, type, power plane, useful load, and gross weight, they are as follows: No. 234—Fokker F-XIV, IXXX, seven-place cabin monoplane, Hornet, 2854 lb., 7200 lb., mail plane, one-place cabin monoplane, Hornet, 2955 lb., 7200 lb.; No. 235—Mercury Chic T-2, two-place open monoplane, LeBlond 90 hp., 578 lb., 1513 lb.; No. 236—Curtiss Thrush "J," six-place cabin monoplane, Wright R-760, 1540 lb., 3800 lb.; No. 237—Curtiss Carrier Pigeon, one-place open biplane, Geared Conqueror, 3390 lb., 7600 lb.; No. 238—Simplex W-2-S, two-place open monoplane, 627 lb., 1779 lb.; No. 239—Brunner Winkle Bird B, three-place open biplane, Kinner 90 hp., 781 lb., 1980 lb.

Waco Profits Reported

TROY (OHIO)—Profits for Waco Aircraft Company for the eight months ended Aug. 31 were $204,067 before Federal taxes, according to a recently issued report.

T. A. T. Orders Cessnas For Supplementary Use

WICHITA (KAN.)—Maj. Howard F. Wehrle, general manager of the Cessna Aircraft Company, announces the sale of four Cessna cantilever monoplanes to Transcontinental Air Transport. The planes, to be powered by 300 hp. Wright J-6 engines, will be delivered by Oct. 15. All are four-passenger planes.

"It is unprofitable for T.A.T. to send a big transport plane across the continent with but three or four passengers aboard," said Major Wehrle. "A smaller plane will be used, I understand, to carry such small loads and surplus loads as well. On the other hand, T.A.T. often is forced to turn down business between cities on its line because of insufficient space on the transport planes. In the future a smaller plane will be pressed into service to carry excess loads between points."

The first four Cessna planes will be used to carry T.A.T. passengers to cities not on the airline. If a Minneapolis man wishes to fly to Los Angeles, a Cessna will be sent to take him to Kansas City where he will be placed on the regular air liner, Major Wehrle explains.

Quality Aluminum Adds To Engine Casting Plant

WAUKESHA (WIS.)—Quality Aluminum Casting Company, this city, reports completion of a large addition to its foundry devoted exclusively to the production of airplane engine castings. The expansion was necessary to meet the growing demand from makers of aero power planes, states A. C. Pankratz, president and general manager of the pioneer aluminum casting firm.

The present foundry is equipped with the latest types of melting furnaces under pyrometer control, assuring alloys free from oxide and porosity.

In connection with the foundry is a modern pattern shop devoted to the upkeep of patterns of its list of casting customers. Fireproof vaults maintained at fitting temperatures to insure against distortion of patterns are a feature.

Name California State Committee

SAN FRANCISCO (CALIF.)—A committee authorized by the legislature to formulate plans for the regulation of aviation in California has recently been formed consisting of three senators and three assemblyman. Roy Bishop, assemblyman of Alameda, Calif., was elected chairman of this committee and Melvyn Cronin, assemblyman of San Francisco, secretary. The existing laws governing aeronautics in the state are being compiled by the Attorney General of the state at the request of the committee, and will be discussed at the next meeting. This committee plans to hold a series of meetings at the State building in this city. They will be open to the public.

Cessnas, Travel Airs to Curtiss

WICHITA (KAN.)—Curtiss Flying Service has just placed an order for $300,000 worth of monoplanes with the Cessna Aircraft Company here to be delivered as rapidly as possible. Twenty-eight four and six-place craft are called for. Five monoplanes valued at $67,500 for use in taxi work at Curtiss airfields have also been ordered by the Service from the Travel Air firm.

Air Derby and Races Feature Oil Exposition

TULSA (OKLA.)—An aerial derby open to craft owned or leased by oil or closely affiliated companies will be a feature of the Sixth International Petroleum Exposition scheduled at this city Oct. 5-12, according to William G. Skelly, president. An aeronautical display and closed course races will also be offered.

The derby will start from a point 500 mi. or more from Tulsa, and planes entering will be required to finish here between 11 a.m. and 6 p.m. Saturday, Oct. 5. First prize will be $2,000, second prize $1,500, and third prize $1,000, in addition to a valuable trophy in each instance.

A plan has been worked out, according to Mr. Skelly, to insure the various entries an even "break" regardless of differences in size, type of plane, and horsepower. Several hundred dollars in cash prizes are also being offered in the closed course events to be held Oct. 6-9 inclusive.

Rules and entry blanks are being supplied interested companies by L. S. Regan, chairman of the contest committee, all entries to be forwarded to Mr. Regan at the First National Bank here.

Line Concern Lauds Firm Tour

MILWAUKEE (WIS.)—Pilot R. B. Ormand has just completed an eleven-month good-will flight for the Line Material Company of South Milwaukee. In this period, Ormand flew some 70,000 mi. visiting electric power companies and attending conventions in 39 states and Canada. J. I. Hursh, of Line Material Company, announced that the trip was highly successful: "We made contracts we had never been able to make before. Concerns were shown how they could extend their own properties by use of planes and that should mean more business for us. The expense was $8,000 for the plane, the salary of the pilot, his expenses, and fuel and oil. That is small compared to what we got out of it."

Pioneer Offers Altitude Chart

BROOKLYN (N. Y.)—Pioneer Instrument Company has issued a new edition of its Air Speed Indicator folder, containing an altitude correction chart for air speed. The charts have also been printed separately on pocket-size cards.

Arkansas Air Tour Closes at Little Rock

LITTLE ROCK (ARK.)—The second annual Arkansas Air Tour ended late Thursday afternoon, Sept. 20, when the twelve planes remaining in the tour landed at the local airport. As the tour ended, it was the general consensus of the participants that the slogan of Arkansas aviation supporters for the immediate future should be "Larger and Better Airports."

On the three-day trip in which fourteen towns were visited, probably the greatest deficiency of Arkansas aviation was the lack of landing facilities in some of the towns. Others have large, well-equipped fields that would do credit to communities of the metropolitan class.

Sixteen planes began the tour, two being forced out on account of minor accidents and two dropping out at Pine Bluff, it not being necessary for them to make the trip to Little Rock. About 12 hr. were spent in the air to cover more than 1,000 mi. Fully 25,000 persons witnessed the landing of the planes at the points visited.

The itinerary included Newport, Hope, Monticello, Fort Smith, McGehee, Hot Springs, Texarkana, Camden, and Stuttgart. The committees at various fields handled the crowds well and had made splendid arrangements for the reception of the fliers. The three "Blackhawks"—Lieut. John B. Bell, Lieut. Thomas J. Hatten, and Lieut. Ellis M. Fagan—staged a program of aerobatics in Warner Command-Aires at each stop.

Results of the tour came up to expectations of the sponsors, the Little Rock Chamber of Commerce and the Little Rock Chapter of the N.A.A. Charles M. Taylor, executive vice-president of the chapter, was in charge of the group at the various stops. Capt. Robert H. Baker was tour commander, and Lieut. Robert W. Chrisp flew the advance ship. Lieut. Fagan was flight leader.

Universal Offers Patch Kit

ST. LOUIS (MO.)—A patch kit has been added to the aeronautical parts and supply department of Universal Aviation Corporation at Lambert-St. Louis Flying Field, according to Hayes Walter, sales manager. The kit contains fabric patches of many different sizes, shapes and styles to answer emergency needs in case of accidental tears. August sales of Universal's parts and supply department, incidentally, showed an increase over July of 8 per cent.

Wausau Firm Reports Sales

WAUSAU (WIS.)—Northern Airways, Inc., this city, has sold 50 planes thus far this year, according to Theodore Schwantes, office manager. The agency sold in both Wisconsin and Minnesota. Directors of the company will meet this month to elect a president, succeeding the late Maj. John P. Wood.

Airplanes Line Up For National Air Tour

DETROIT (MICH.)—As the departure time of the fifth annual National Air Tour draws near Ray Collins, manager of the event, has announced that there will be at least three women pilots in the line-up when E. W. "Pop" Cleveland, who has been appointed official starter, drops the flag on Entry Number One, a Great Lakes trainer, flown by Charles W. Meyers, next Saturday morning. Besides Miss Harrell, the other two known contestants are Mrs. Keith Miller and Miss Mae Haizlip, both of whom participated in the womens' transcontinental derby to the National Air Races in Cleveland. Miss Harrell, herself, competed in one of the events for women fliers at Cleveland.

Since publication of the last entry list a number of notable entrants have been compelled to withdraw their entries for one reason or another, among these being the Carrier Pigeon II, entered by the Curtiss Aeroplane & Motor Company, which was to have been piloted by P. M. Boyd, one of the two Command-Aires entered by Command-Aire, Inc., and a Hornet powered Consolidated monoplane. It previously had been announced that the three autogiros, entered by the Pitcairn Cierva Autogiro Company of Philadelphia, would not compete in the Tour. At least one of these craft, however, will be shipped to Detroit to make exhibition flights for spectators watching the Tour planes depart.

Thirty-Seven Entries Listed

At the present writing there are exactly 37 planes officially entered in the event, and it is not unlikely that acquisition of Department of Commerce Approved Type Certificates or other factors will compel two, and possibly three, additional entrants to drop out before the start. According to the rules this year each entry must be covered by an A.T.C. before it is eligible to compete. Since a considerable number of the entries are newly produced types this rule is expected to be a major reason for last-minute withdrawals.

The National Air Tour departure, this year, will be the initial event on a day's aerial program at Ford Airport, a program committee, under Fred Black, advertising manager, Ford Motor Company, having arranged a number of interesting activities to hold the spectators on the airport throughout the day. These events will include a balloon race, sponsored by the Detroit News and having an entry list of six balloons, glider flying by use of the shock cord, automobile and airplane, and the presence of two or more Goodyear blimps.

New Quarters for Miami Firm

MIAMI (FLA.)—Miami Airplane & Supply Company, this city, has moved to larger quarters where they will build new planes and repair and rebuild damaged planes. A. L. Hefinger is general manager.

To Ask States to Air Code Meet

MILWAUKEE (WIS.) — Wisconsin having joined the movement for a unified air code, Assemblyman Harry G. Slater, secretary of the legislative committee on aeronautical legislation, has proposed a conference to be held in Milwaukee this winter, with other members of the committee favoring the idea. Representatives of Illinois, Minnesota, Michigan, Iowa, Ohio, and North and South Dakota will be invited to discuss air regulations with the Wisconsin officials.

Wichita Aero Section Of S.A.E. in Conference

WICHITA (KAS.) — An organization meeting of the Wichita Aeronautical Section, Society of Automotive Engineers, was held here Friday, Sept. 20, with Mac Short, vice-president and chief engineer, Stearman Aircraft Company, presiding. The program featured a paper on "Load Factors" by Prof. A. S. Niles, of Leland Stanford University, and another one on "Trend in Design," by A. W. Mooney, former chief engineer, Alexander Eaglerock Company, and now president of Mooney Aircraft Company, here.

Officers of the section, named to serve temporarily, were: Mr. Short, chairman; L. H. Stratton, vice-chairman; L. H. Whitlock, secretary; Andrew Swenson, treasurer. A. W. Mooney was named chairman of the program committee, F. A. Dobbe, chairman, membership committee, and Lloyd Stearman, chairman, reception committee. It was decided that the section would meet on the first Thursday of each month.

The first speaker on the program was A. J. Underwood, of the standards department of the Society, who outlined the work of the S.A.E., with particular reference to the organization's efforts toward standardization of aircraft parts.

Develop Rubber Safety Devices

AKRON (OHIO)—Rubber shock absorbing devices which, it is claimed, will eliminate a number of the fatalities resulting from forced airplane landings, are being developed by the experimental laboratories of Central Tire & Rubber Company here, it is announced by William F. O'Neil, president of the company. Among the devices upon which the tire company experts are working are rubber shock absorbers for airplane landing gears, rubber insulators for joints that bear the brunt of heavy shocks in collisions or rough landings, rubber shields for wing tips and for the joints that connect the wings to the fuselage, and rubber engine mountings designed to minimize vibration in the airplane when in flight.

Deliver New Boeing Transports

SEATTLE (WASH.)—Delivery is being made here on four of the new Boeing eighteen-passenger tri-engined planes to Boeing Air Transport.

Barber & Baldwin Trophy Goes to Davis

NEW YORK (N.Y.)—Douglas Davis, advices received here state, has been awarded the Barber & Baldwin Merit trophy for his flying in the National Air Races. The award is granted for meritorious performance.

It will be recalled that Davis took first place in the free-for-all speed race, in which he flew the new J-6 powered Travel Air low-wing, and that he also was adjudged winner in the civilians' experimental plane race, in which he piloted the Travel Air low-wing powered with the Chevolair engine. His aerobatics in the J-6 Travel Air were also a feature of the races.

Davis is divisional manager at Atlanta, Ga., for Southern Air Transport, a subsidiary of The Aviation Corporation. He has been interested in air racing since 1926 when at the National Air Races at Philadelphia he won the Valley Forge Trophy offered during that competition. He also participated in the National Air Races in 1927, but was unfortunate enough to be forced down in one of the transcontinental races when flying to the Los Angeles races last year. Army trained, Davis has flown since 1917.

Col. Arthur C. Goebel was named winner of the Barber & Baldwin Merit Trophy last year.

Navy Makes Study Of Parachute Porosity

WASHINGTON (D.C.)—A special apparatus for calculating the amount of air passing per minute through parachute fabrics has been developed by the Navy Department in cooperation with the Bureau of Standards, it was stated here Sept. 25. The limits of porosity of parachute materials were determined by testing the fabrics on the apparatus and then conducting service tests to determine the rate of descent of the parachute.

Parachutes are designed to retard the rate of descent of a man jumping from an airplane so that he will strike the ground at a speed equal to that attained by jumping from a height of eight feet, approximately 22 ft. per second, it was stated. The rate of descent depends principally on the area of the parachute and the porosity of the fabric from which it is constructed. The area is limited by the bulk of the material as the parachute must be packed into a small container.

Airtech Adopts Ocker System

SAN DIEGO (CALIF.) — Airtech School of Aviation, operating at Lindbergh Field here, has signed a contract with Capt. William C. Ocker calling for incorporation in the school's regular student curriculum of the Ocker System of Blind Flying. This method is being used in the training of Army and Navy pilots.

Army to Restrict Participation in Meets

WASHINGTON (D. C.)—Influenced by the receipt of an average of fifteen applications weekly for Army Air Corps participation in air meets and airport dedications, the War Department has ordered that hereafter Army aircraft will not be permitted to take part in these events unless the celebration has features of military significance, or is connected with the dedication of a municipal, state or federal airport having at least a C3X rating. Participation will not be allowed on Sundays, national holidays or Armistice Day, nor at celebrations in which such events as wing walking, changing from one plane to another, etc., is done by other participants.

Personal expenses of the pilots must be defrayed by the promotors of the events and fuel must be supplied for all flying during the event and for the return journey. The rule continues to apply that no exhibition flying will be allowed on the part of the Air Corps men without an indemnity bond or insurance policies covering possible property or public damages. Coverage has been set at $50,000 for public liability and $25,000 for property damage, regardless of the number of planes involved.

To Build 12 Thrushes For Chinese Air Service

ST. LOUIS (MO.)—Among the first Curtiss Thrush cabin monoplanes to be built here by Curtiss-Robertson will be twelve planes designated for air mail and passenger service in China. The Thrush factory itself is nearing completion and it will not be many months before production will be started.

The twelve planes will be sent to China under a government contract obtained early this year by Maj. William B. Robertson, head of Curtiss-Robertson Company, under terms of which the Curtiss organization will operate about 3,000 mi. of air mail and passenger lines using American pilots and equipment.

As previously announced, four Curtiss Fledgling training planes are being shipped to China this week to be used in training native pilots. The latter will eventually take charge of operations.

Air Medical Group Meets

DETROIT (MICH.)—The Air Medical Association is holding its first national convention at the Hotel Statler here, Oct. 7. The association was formed at the International Aeronautics Conference in Washington last December. Its members are Army, Navy and civilian physicians who pass on the physical fitness of pilots. The first convention will discuss methods of diagnosing and treating ailments caused by air travel, according to Dr. J. L. De Rosier, a local member of the association.

New Turn and Bank Indicator

NEW YORK (N. Y.)—Successful flight tests of a newly-designed turn and bank indicator for airplanes, said to have radical improvements in construction and operation recently were conducted at Roosevelt Field, L. I., by the manufacturers, Consolidated Instrument Company. High accuracy is reported. Aircraft Control Corporation of Philadelphia, manufacturing and research division of Consolidated, is responsible for the development of this new indicator.

Specially-Fitted Aero Firm Aristocrat on Tour

ROOSEVELT FIELD (N. Y.)—"Sample Case," the General Aristocrat plane recently purchased by Aero Supply Manufacturing Company, has left this field on a tour in the interests of the firm's business. The Aristocrat is specially fitted with panels built into the fuselage which contain samples of various hardware products made by Aero.

With George I. Stich, Aero Supply president, in charge of the tour and flying as principal representative, the initial journey will take the "Sample Case" to most of the Eastern States. Later, similar tours will be made through the Middle West, South, and West Coast. Leo Katzman, General Airplanes Corporation test pilot, is flying the plane.

Doors giving access from the exterior of the plane open to the various display cases in which are mounted the standard parts, such as nuts, bolts, turnbuckles, shackles, tie rods, etc., while duplicates of the items are installed in the structure of the plane itself.

Aero Supply Manufacturing Company controls and operates, in addition to its factory at College Point, Standard Automatic Products Company of Corry, Pa., and National Steel Products Company with factory at Dayton, Ohio.

Soviet Plane at Sitka In Flight to New York

SITKA (ALASKA)—With the safe arrival here of the Russian plane, "Land of the Soviets," on its way from Moscow to New York, radio messages which had been received from it as S.O.S. calls were found to have been misinterpreted. From this town, the fourth stop on American territory, the craft will fly to Seattle, from there to San Francisco, and then across the continent to New York by the way of Chicago.

"Land of the Soviets" is similar in onstruction to the first all-Russian plane which crashed in the Siberian wilderness on Aug. 8 on the first leg of the proposed Moscow-New York flight which is now turning out successfully.

The crew escaped injury and are now piloting this second plane which left Moscow on Aug. 23. They are Semyon Shestakov, first pilot; Philip E. Bolotov, second pilot; Boris V. Sterlingov, navigator, and Dimitri V. Fufaev, mechanic.

"Land of the Soviets," powered with two 600 hp. engines, was built under the direction of A. N. Tupoleff, aviation engineer of the Central Aero Hydro-Dynamic Institute of the U.S.S.R.

It is a monoplane, with a wing span, including the aileron compensators, of nearly 94 ft.; has an overall height of 15 ft. and is 59 ft. in length.

Pontoons have replaced landing gear over water stretches. The fliers have also been aided by wireless communication over their route which has already included twelve stops.

Swallow TP Price Cut $245

WICHITA (KAN.)—A cut of $245 in the price of its OX-5 powered training planes is announced by Swallow Airplane Manufacturing Company, this city. The new price is $2,878 with the engine and propeller included.

National Traffic Conference Was Outgrowth Of Club Which Three Men Organized in Fun

KANSAS CITY (MO.)—Few, perhaps, are acquainted with the fact that the organization responsible for the first National Air Traffic Conference recently held here with an attendance of 150 delegates representing 31 major air transport lines—originally was the result of a joke!

Less than a year ago, C. E. Fleming, then N.A.T. divisional traffic manager here, and W. H. Johnson and William Smith, passenger and mail solicitors for Universal Air Lines, began to meet occasionally to "talk shop." One day Fleming jokingly proposed the banding of the three as the Kansas City Air Traffic Managers' Club, and with the others in agreement each of the trio was named an officer.

Shortly thereafter, Western Air Express made Kansas City its eastern terminal, and George Lord, sent to Kansas City as traffic manager, was welcomed into the club for the price of a luncheon for the three charter members. Lord also was made an officer. One after another, others joined, and weekly luncheon meetings were held.

Recently, George Lord laid plans for nationalization of his group before the Aeronautical Chamber of Commerce in New York. Approval was given, a national conference was planned, and invitations were sent to every transport line in the country asking that they send delegates. The successful Sept. 16-18 conference followed resulting in the formation of the Air Transport Section of the Aero Chamber of Commerce.

Early Reports of Balloon Race Show U. S. Tie

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the national anthem of the country represented.

Officials were: referee, Alan R. Hawley; starter, Maj. Albert Bond Lambert; timer, Carl F. G. Meyer; and measurer, Capt. Paul McCullough; judges, Augustus Post, Francis Murphy, Arch Hoskins, and Elmer Marschutz. All are of St. Louis except Hawley and Post, who are New Yorkers.

All balloons were required to carry a barograph which was lead-sealed by officials. All elected to carry radio receivers. Other common equipment included an altimeter, ballast bags, flashlights, sextant, compass, parachutes, lightning arrester, collapsible rubber boat, food for five days and emergency rations. Some had oxygen tanks, heating pads and pontooned baskets.

Inflation of the balloons started at 7 a.m. the morning of the race. Each was filled with 80,000 cu.ft. of coal gas pumped through a special piping from a nearby plant of the Laclede Gas Co. During inflation, each craft was weighted down with 120 bags of sand weighing 40 lb. each. These were shifted as the volume of gas increased.

List of Prizes

A first prize of $1,000 will go to the winner of the race. The remaining four places draw $800, $600, $400 and $200, respectively. In addition, Mr. Hawley had offered $1,000 in prizes to the pilots setting new American and European distance records. A bonus of $500 is given each foreign crew and $100 to each American crew, regardless of where they place. The St. Louis Chamber of Commerce raised $22,500 to defray all expenses.

Balloons are disqualified if they land on water or on a ship, or if a pilot or aid jumps overboard. Upon landing, the pilot must immediately notify the National Aeronautical Association by telegram.

The victor of the race is entitled to keep the Gordon Bennett Cup for a year and a nation gains permanent possession of the trophy when it has three races to its credit. The first cup was won by Belgium and the second by the United States. The third cup was donated by the Detroit Chamber of Commerce and is now in competition for the first time.

Various Equipment Carried

Equipment on the Navy balloon included: Goodyear bag and air pontoons on side and bottom of basket, Burgess radio, Brandeis bubble sextant, Hallam heating pads, Irving Navy parachutes, Pierce's navigational tables, Eveready flashlight and Very pistol.

The Army balloon was made at Scott Field, Ill. It was equipped with an Atwater Kent radio, lightning arrester, air pontoons, and Army parachutes. The Goodyear balloon had standard Goodyear equipment.

Build Large Nitriding Furnace

CANTON (OHIO)—Central Alloy Steel Corporation has completed construction and started operation of what is said to be the largest nitriding furnace in the world at its local works. The new furnace will be utilized to promote the use of nitralloy, one of the important new alloys being produced by the company under Krupp licenses. The metal is reported to be attracting wide interest in the aviation equipment industries, where it is used in making various moving parts.

New Firms Announced

AERONAUTICAL HOLDINGS, LTD., Ottawa, Ont.; capital 1,000 shares no par value.

AIRCRAFT PRODUCTS COMPANY, Windsor, Ont.; capital 500 shares no par value preferred stock and 100 shares no par value common stock.

WHEELER AIRCRAFT CORPORATION, Phoenix, Ariz. (California incorporation); capital 1,500,000 shares no par value.

UNITED AIRCRAFT INVESTMENT CORPORATION, Reno, Nev.; capital 200,000 shares of stock, par value $5; by J. E. Sullivan, E. Armstrong and F. C. Norton.

AIRWAYS CORPORATION, Tallahassee, Fla.; capital 50 shares no par value; by F. M. Crawford, E. L. Boyce and I. H. Arnold; to handle securities.

ASSOCIATED AIR SERVICES, LTD., Sacramento, Calif.; capital 70,000 shares no par value; by Thos. F. Butler, M. L. Gorman, R. S. Gorman, E. P. Kayser, A. P. Mantz, H. W. Klee, J. H. Sabalot and N. S. Sonna.

CONTINENTAL AIRCRAFT CORPORATION, New York, N. Y. (Delaware Incorporation); capital 16,500 shares no par value; Hugh Copeland, president; to manufacture and deal in aircraft.

Representatives Named

AERO SUPPLY MANUFACTURING COMPANY — Curtiss Flying Service will handle sales of a full line of Aero Supply screw machine products and detail parts for airplanes.

ALLIANCE — Massachusetts Airway Corporation, Springfield, Mass.; for Massachusetts and Connecticut.

TRAVEL AIR—San Diego Air Service Corporation, San Diego, Calif.; for Riverside County.

EAGLEROCK—S. A. Sagehorn, Salinas, Calif.

FAIRCHILD—J. B. Alexander, Los Angeles, Calif.

FLEET — Aero Corporation of California; for Southern California.

DAVIS—Columbia Airways, Inc., Salt Lake City, Utah.; Aero Corporation of California, Los Angeles.

CURTISS FLYING SERVICE — Mamer Air Transport Company, Spokane, Wash.; for Pacific Northwest.

Simulated Fog Landings And Take-Offs Made

(*Concluded from page 718*)

mospheric change are now in process of development, and the Fund is assisting in this experimentation. Notable among these is the sonic altimeter, a development by Dr. Elmer Sperry, and the radio altimeter now being developed by the General Electric Company.

"Also, while the pilot flies at sufficient altitude to clear all surrounding obstructions in coming into the field, the problem of collision with other aircraft in the air when flying through fog is a serious one. This can only be eliminated today by telephonic orders from the ground directing the planes flying over the same routes so as to keep out of each other's way. The perfection of an instrument to warn of the approach of another plane is a device for the future. In addition, while the particular beacon used in the Fund's experiment is located at the edge of the field, the beacons of the future will be so located that it will be possible to land always into the wind. These are examples of the developments that should be greatly stimulated from now on."

Lieut. Doolittle also speaks of a plan whereby a radio border marking the outlines of an airport would greatly aid the pilot in guiding an airplane to a landing during foggy weather.

Asks I.C.C. Aero Regulation

WASHINGTON (D. C.)—Authority of the Interstate Commerce Commission to regulate interstate air service in order to stabilize that industry was proposed in a bill introduced in the House on Sept. 26 by Representative Cable of Ohio, and referred to the Committee on Interstate and Foreign Commerce. Senator Bingham of Connecticut has announced, in this connection, that he will propose an amendment to the air commerce act of 1927, which would broaden the authority over air commerce delegated to the Secretary of Commerce. The amendment will be offered late in the special session or soon after the regular session begins in December.

Berliner Denies Allied Negotiations

"There are no negotiations whatever under consideration between Allied Aviation Industries and the Berliner-Joyce Aircraft Corporation," states W. W. Moss, president of the latter firm, in a recent communication written to refute stories lately published declaring that an amalgamation or absorption of the Baltimore firm was projected by Allied.

PERSONNEL

CAPT. EDWARD J. BROOKS, Denver, Colo., has been appointed managing director of Gates Flying Service, New York City. ARTHUR L. GUILLERMAIN has been appointed director of publicity.

CLEM G. TRIMBACH, recently engineer at Wright Field, Dayton, Ohio, has been made armament engineer for Curtiss Aeroplane & Motor Company.

"TOM" LIVINGSTON is now Peoria manager for National Airways System with headquarters at Peoria, Ill. BEN MCMILLION has succeeded Livingston as manager of the Bloomington, Ill., field of National Airways System.

ROBERT ORTWEIN has been made traffic agent for T.A.T. for Oklahoma and part of Kansas, with headquarters at Wichita.

HENRY SMITH, recently district passenger agent for Western Air Express at Wichita, has been transferred to New York. He is replaced at Wichita by C. A. NICKERSON.

H. A. ANDREWS has been appointed general manager of Okay Airplane factory, Muskogee, Okla.

SUMNER SEAWALL, general traffic manager of Colonial Air Transport, has sailed for a month's tour of European air lines.

"AL" CHEESEMAN, pilot of Northern Aerial Mineral Exploration Company, Toronto, Canada, will be pilot for Sir Hubert Wilkins on an Antarctic trip.

OPIE CHENOWETH, formerly in charge of the power plant testing laboratories, Wright Field, Dayton, Ohio, has resigned to become research engineer for General Motors Research Corporation, Detroit.

HAYDEN BROOKS, president of Birmingham (Ala.) chapter of N.A.A., has been made N.A.A. governor for the state.

PAUL G. WELLENKAMP, formerly shop superintendent of Fairchild Engine Corporation, is now assistant production engineer for Wright Aeronautical Corporation, Paterson, N. J.

FRANK KERN has succeeded ELMER DEMPSEY as test pilot for Curtiss-Robertson Airplane Manufacturing Company, St. Louis. Dempsey resigned to become pilot for John T. Milliken, Evinrude distributor.

J. S. BOONE, recently with Curtiss-Robertson, has been appointed chief instructor at American School of Welding, St. Louis.

L. J. ROBINSON has been appointed general sales manager of Detroit Aircraft Corporation.

LLOYD CHILD, project engineer of the airplane design section of Curtiss Aeroplane & Motor Company, Garden City, N. Y., is stationed temporarily at the Curtiss-Robertson Aircraft Manufacturing Company plant, St. Louis.

LIEUT. FREDERICK SCHAUSS, recently operations manager of Congressional Airport, Washington, D. C., has been appointed sales and demonstration pilot for New Standard Aircraft Corporation, Paterson, N. J.

HUBERT SCHWENKE, formerly with Knoll Aircraft Company, is now stress analyst for Spartan Aircraft Company. A. M. WYNNE and G. F. DARRACOTT have also been added to the engineering department.

GEORGE W. GUNNER has joined the engineering staff of Sikorsky Aircraft Corporation as designing engineer.

COL. R. C. LOWRY, Austin, Tex., has been made traffic manager for Corporacion Aeronautica de Transportes.

RAY W. BROWN, recently sales manager for Travel Air, has been appointed general sales manager for Parks Air College, Inc., East St. Louis, Ill.

DAMON HOWARD has been appointed assistant treasurer of Universal Aviation Corporation, St. Louis. R. D. NEWTON has been appointed operations manager for Universal at Garden City, Kan.

THOMAS W. BANE has been elected vice-president of Colonial Airways System. Other new officers elected are: A. O. CUSHNY, treasurer; OLIVER A. GOTTSCHALK, assistant treasurer; CLARENCE H. BAHN, assistant secretary; MARGARET F. DALEY, assistant secretary. New members of the board of directors of Colonial Air Transport are: WILLIAM DEWEY LOUCKS and WILLIAM A. ROCKEFELLER, both of New York. New directors of Canadian Colonial Airways are: ARCHIE E. LOWE, Ottawa, chairman, and MALCOM R. WHITE, New York.

FREDERICK W. PEEL, service manager, has been placed in charge of service at the Chicago Division of Air Associates, Inc., and HAROLD I. CROW has been appointed branch manager of the Roosevelt Field (N. Y.) division. BREWSTER HOBSON is in charge of the service shop at Roosevelt Field.

JOHN A. COLLINS, recently superintendent of the western division T.A.T., has been transferred back to the eastern division with headquarters at Port Columbus. S. D. WELSH, eastern division superintendent, goes to Los Angeles.

CHARLES CUTTER will begin his duties as manager at Hartford, Conn., for Colonial Transport, Oct. 1.

Delta Extends Service

DALLAS (TEX.)—The Delta Air Service, Inc., operating between Dallas and Jackson, Miss., has extended its airplane passenger and express service to Birmingham, Ala. The extension to Birmingham will connect with the Southern Airways, which operates airplane passenger service between Birmingham and Atlanta. The Dallas terminus of the Delta lines already connects with the Texas Air Transport, which gives service westward to El Paso, and with the Southwest Air Fast Express, which operates passenger planes to Kansas City and St. Louis.

TRADE TIPS

It has been reported that

Dallas Airport Utilities Corporation will soon let the contract for construction of a hangar. Chas. W. Davis, 4815 Live Oak St., Dallas, Tex., is secretary-treasurer.

San Francisco Airdrome, Inc., is having plans completed for administration building, hangars, etc., at the airport in Alemeda, Calif., to cost about $1,000,000. Administration building is to be of stucco, and hangars of steel.

The city council of Santa Cruz, Calif., is considering plans for a municipal airport.

Bids are being taken for a hangar 142 x 145 ft. for Curtiss Flying Service at Mines Field, Los Angeles, Calif.

La Crosse, Wis., of which F. L. Kramer is City Clerk, will erect a 64 x 80 ft. hangar next year at the municipal airport.

Bids are being received for construction of 75 x 80 ft. factory building for Irvin Airchute Company at Grand Central Airport, Glendale, Calif.

Eastern Aeronautical Corporation will build a new hangar, designed for repairing planes and reconditioning engines, at Newark Airport next spring. George A. Vaughn, Jr., 14 South Munn Avenue, East Orange, N. J., is president of the company.

Auto Parts Company, Indiana, Pa., is planning to establish an aviation parts and supplies department, dealing in helmets, uniforms, goggles, spark plugs and other minor items.

Schools and Colleges

IOWA STATE COLLEGE, Ames, Ia., reports an increase of 35 per cent in enrollment in mechanical engineering courses, attributed to the establishment of a new course in aeronautics.

CURTISS FLYING SERVICE has opened a new aviation ground school in Moline, Ill. E. K. Campbell, midwest manager for Curtiss Flying Service, is in charge of the school.

NEBRASKA SAILPLANE AND AVIATION SCHOOL, Omaha, Neb., will hold night classes.

FLO SCHOOL OF FLYING at Ann Arbor, Mich., opened its fall and winter term Sept. 30, coincident with the opening of the semester at the University of Michigan.

ST. LOUIS-UNIVERSAL FLYING SCHOOL has started a day welding class. The school's fifth mechanic class was graduated from the night school recently, eleven students being graduated as apprentice mechanics. Fifteen students were graduated from the school's third aviation business course.

BOSTON UNIVERSITY has inaugurated a course in elementary aeronautics for public school teachers.

LUDINGTON PHILADELPHIA FLYING SERVICE has reopened its ground school at Central Airport, Camden, N. J.

BRIEFLY

Tri-weekly service between El Paso and Mexico City has been put into operation by Standard Air Lines and Corporacion Aeronautica de Transportes S.A. The new service makes connections with the El Paso-Los Angeles route which is also operated by Standard Air Lines.

Active work has begun at Boeing Airplane Company's Seattle factory on the production of 90 high speed pursuit planes for Army Air Service. This is the second largest order for airplane construction ever placed by the government. Delivery of the whole order is to be made between Nov. 10, 1929, and April 10, 1930.

Twentieth Century Aircraft Corporation, Syracuse, N. Y., has increased its no par value capital stock from 5,000 to 50,000 shares.

Amendments to regulations which would permit experienced automotive mechanics to secure aircraft mechanic's licenses without undergoing the one year's experience required have been proposed by Thomas L. Hill, President of the American Society for the Promotion of Aviation, New York City.

Continental Air Lines, Inc., has completed a year's operation of mail and passenger planes between Cleveland, Ohio, and Louisville, Ky., with over 500,000 mi. of flying, without a single mechanical failure or injury to any passenger. The company has just bought three new Hornet-powered Stearman planes.

Ryan Aircraft Corporation reports the sale of 30 Ryan broughams, valued, with spare parts, at approximately $390,000, in foreign countries during the past eighteen months. Nine Ryans are operating in China, and nine in Mexico.

Lambert Aircraft Corporation, subsidiary of Allied Aviation Industries, has received an order from Nicholas-Beazley Airplane Company, Inc., for two engines weekly until further notice.

The work of marking Ohio highways as an aid to aviators will begin shortly. The markings will be 25 or 30 mi. from cities, and will consist of the name and number of the highway in letters not less than 10 ft. high.

During the Nebraska air tour, 2,300 passengers were carried, paying about $7,000, and covering a total of about 144,000 mi., without a single injury to any passenger.

National Air Travelers Association moved into new headquarters in the Chicago Motor Club Building, 66 East South Water St., Chicago, on Oct. 1.

The sub-committee on airports of the New York Mayor's Advisory Committee on Aeronautics has completed a survey of possible future sites for municipal airports.

Matt F. Morse, secretary and manager, Automobile Club of Missouri, has gone to the Pacific Coast to make a survey of air travel conditions.

Clyde E. Pangborn and Carl A. Dixon, New Standard Aircraft Corporation, have started a tour of the West to demonstrate the company's planes. Pangborn has a Model D-25A, five-place open cockpit machine, and Dixon has a New Standard training plane.

Columbus (Ohio) branch of Curtiss Flying Service carried 1,427 passengers a total of nearly 12,000 mi. during August, acording to the company's official report.

Carrying a total of 155 passengers, 115 planes arrived at and departed from Boston Airport during the week ending Sept. 23.

Time of departure of the afternoon Continental Air Express plane from Los Angeles to San Francisco has been advanced from 3 to 2 p.m., so that the flights can be completed in daylight during the winter months.

William Miller, Berliner-Joyce Aircraft Corporation, has been elected associate fellow of the Royal Aeronautical Society of Great Britain.

AERONAUTICAL CALENDAR

Oct. 5-21	National Air Tour, Starting from Ford Airport, Dearborn, Mich.
Oct. 7-12	Air mail observance, auspices Direct Mail Advertising Association Convention, Cleveland, Ohio.
Oct. 14	Regional Airport Conference, Atlanta, Ga.
Oct. 22	Aeronautics program, A. S. M. E., Akron, during convention to be held Oct. 21-23.
Oct. 24-25	Conference on Municipal Airports at Washington, D. C., under auspices of the American Road Builders Association.
Oct. 31	Discussion of airport paving at Eighth Annual Asphalt Paving Conference, West Baden, Ind., Oct. 28-Nov. 1.
Nov. 7-8	All Western Airport Conference, Los Angeles, Calif.
Nov. 8-10	Intercollegiate Aeronautic Conference, Columbus, Ohio.
Nov. 9-17	Western Aircraft Show, Los Angeles.
Nov. 18	Lehigh Airport Design Competition Closes. Lehigh Portland Cement Company.
Dec. 10-16	National Aviation Week, Mexico, including air show and air display at Mexico City.
Dec. 16	Regional Airport Conference for New England, Bridgeport, Conn.
1930 February	National Air Show, auspices Aeronautical Chamber of Commerce, St. Louis.
Feb. 5-12	New York Aviation Show, auspices Aviators' Post, American Legion.
Mar. 6-15	Second Annual Pittsburgh Aircraft Show. Motor Square Garden, Brown Boulevard, Pittsburgh, Pa. Office is Yellow Club, Pittsburgh, William Penn Hotel.
April 5-13	All-American Aircraft Show, Detroit
May 3-10	New York Aircraft Salon, auspices Metropolitan New York Division, Distributor-Dealers Section, Aeronautical Chamber of Commerce, at Madison Square Garden, New York City.

AIR MEETS

Oct. 5-6	Walker Airport, Windsor, Ont.
Oct. 5-6	At St. Hubert Airport, Montreal; auspices Montreal Light Plane Club.
Oct. 6-9	Races, Sixth International Petroleum Exposition, Tulsa, Okla.

AIRPORT DEDICATIONS

Oct. 12	Florence, Ariz.
Oct. 12	Conneaut Airport, Conneaut, Ohio.
Nov. 11	Duluth Municipal Airport, Duluth Minn.
Nov. 15	Curtiss-Steinberg Airport, St. Louis Mo.
Nov. 15	Kinsolving Airport, Abilene, Tex.

Municipal Airport of Mobile, Ala., will hereafter be known as Bates Field.

Aircraft City Corporation, New York, N. Y., has increased its capital stock from $20,000 to $30,000.

Maj. Clarence M. Young has accepted delivery of a new model Stearman plane, powered with a New Whirlwind Nine.

Governor William H. Adams of Colorado has issued a statement urging all towns and cities in the state to erect uniform air markers.

Lieut. Harold Bromley has abandoned his plan to fly the Pacific this year, but will begin preparations immediately for a flight early in 1930. He will have a new low-wing Lockheed plane.

Thirty planes participated in a three-day air meet at Athol, Mass., Sept. 13-15. About 25,000 people were reported to have attended at Athol-Orange Airport during the meet.

Bach Aircraft Company, Los Angeles Metropolitan Airport, has twelve tri-engined, ten-place transport planes under construction, according to an announcement by B. L. Graves, president. The fourth unit of the company's factory has recently been completed.

Rapid Air Lines Corporation, Sioux Falls, S.D., is considering moving its headquarters to Omaha, Neb., to the Omaha Legion Airport, where it would establish an aviation school, airplane agency and base for its airplanes.

Negotiations have been completed for the acquisition of Eastern Aircraft Corporation by Dayton Airplane Engine Company.

Regular production of the Travel Air low-wing monoplane, which won two events at the Cleveland Air Races, will be instituted soon.

Rates on the Los Angeles-San Diego route of Continental Air Express have been cut to $14.95 for the round trip. The round trip fare between Los Angeles and San Francisco is $40.

Standard Oil Company of Louisiana has accepted delivery of an eight-place Keystone-Loening amphibion for business use.

Members of Canadian light airplane clubs flew more than 10,000 hr. during the first eight months of this year, exceeding by nearly 2,000 hr. the total flying time for 1928. The Winnipeg club is first, with Toronto, Ottawa and Montreal following in that order. One hundred ninety-two private pilots and 57 commercial pilots graduated from the club up to Sept. 1, this year.

AC Spark Plug Company will add a new three-story building, 100 x 160 ft., with 42,000 sq.ft. of floor space, to its factory at Flint, Mich.

Only 398 lb. of wood representing 17 per cent of the entire construction, is being used now in the latest model of the Ryan brougham.

Classes in Spanish have been inaugurated for all employees of Pickwick Airways following recent inauguration of the Los Angeles-Mexico City-Guatemala air lines through its subsidiary, Latin-American Air Transport.

AIRPORTS AND AIRLINES

Plan Two New Lines in Northwest

MINNEAPOLIS (MINN.)—Two new passenger lines are in prospect for Minneapolis in the near future, according to information received here.

One line will be opened within the next few days from Minneapolis to Duluth, connecting there with a line now operating between that point and Port Arthur, Canada. Arrowhead International Airways, Inc., will operate the line, using Lockheed Vegas.

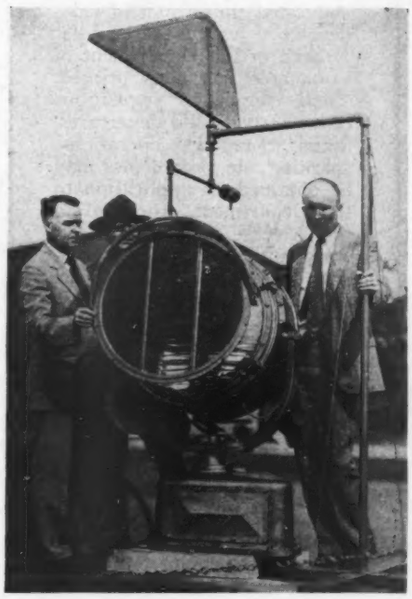
Survey for a line from Twin Cities to Spokane, Wash., will be started within a few days by International Air Transport a Spokane corporation. The line will be put into operation next spring. A 12-hr. service on the Twin Cities-Spokane route is contemplated. The line will connect Minneapolis with Fargo, and Bismarck, N. D., Glendive, Billings, Livingston, Butte and Missoula, Mont., as well as Spokane. It is planned to use tri-engined planes over the mountainous section from Spokane to Livingston. Six-place single-engined machines will be used over the remainder of the line.

Install West Coast Ceiling Lights

ROSEBURG (ORE.) — Installation of ceiling lights at weather reporting stations along the Pacific Coast airway has been started by the Airways Engineering Corporation, of San Francisco. The lights are to be installed in the following order: Carquinez Bridge, Corning, Redding, Mt. Shasta City, Montague and Hilt in Calif.; Medford, Wolf Creek, Roseburg, Eugene, Salem, and Oregon City, in Oregon; Castle Rock and Chehalis, in Washington; Lebec and Sandberg, in California. These lights will be maintained and operated by weather bureau observers and will be in addition to similar lights installed by other municipalities and the government lighthouse service. Installation will be completed prior to the inauguration of night air mail flying expected to start this winter.

Plan Mid-West Amphibion Routes

ST. LOUIS (MO.)—National Air Boat Express, Inc., has been formed here to operate passenger lines between Minneapolis, St. Paul and New Orleans, with branches to Pittsburgh, Chicago, and Kansas City. The new company will use amphibions, and will operate over the Mississippi, Ohio, Illinois and Missouri Rivers. Charles Davenport, Kansas City, is president. Tentative schedules call for the following time from St. Louis: to Minneapolis, 5½ hr.; to New Orleans, 7 hr.; to Chicago, 2½ hr.; to Kansas City, 3 hr.



Colored filter in place over beacon. Wind vane at top. Left to right: Maj. Francis Boyle, Reserve Corp, Capt. L. H. Palmer, Quartermaster Corp, Capt. D. B. Howard, Patents Division, Air Corps

Regional Airport Conferences

NEW YORK (N. Y.)—The next two regional airport conferences to be held under the auspices of the Aeronautical Chamber of Commerce are scheduled for Oct. 14 at the Atlanta-Biltmore Hotel, Atlanta, Ga., and Nov. 7-8 at Los Angeles. The latter is to be known as an All-Western Airport Conference and will be held just prior to the Western Aircraft Show Nov. 9-17. The first of these conferences was held at Boston, Sept. 23.

Plan New Michigan Line

TRAVERSE CITY (MICH.)—Furniture Capital Air Service will inaugurate year around service over the 160 mi. between Grand Rapids and Petoskey about Nov. 1. Two round trips a day with stops at Big Rapids, Cadillac, Traverse City and Charlevoix are planned, using two Stinson-Detroiters equipped with a combination ski and wheel landing gear during the Winter months.

Neon-Sign Urges Air Mail Use

ATLANTA (GA.)—Located at one of the busiest downtown street intersections here is a flashing Neon sign on which are the words "Use Air Mail." This method of calling attention to the air mail service was erected under auspices of the local chamber of commerce.

Testing New Wind Indicator For Airways

WASHINGTON (D. C.) — A device operated by a wind vane to color the beams of airway beacons when they flash in the down wind direction, is being tried out at Bolling Field, under the supervision of the Aeronautics Branch and Air Corps officials. It is claimed that the apparatus is inexpensive and can be installed on the standard airway beacon without the necessity of any change. Maj. Francis Boyle, of the Reserve Corps, the originator of the design, has made application for patents.

The operation of the device is entirely automatic. The wind vane lowers a colored filter over the beacon when it revolves to the down wind direction. In order to avoid confusion with other airway markers, the filter is of variegated color at present, the center pannel being green and the outer pannels being red. Thus the pilot receives a colored flash when he is flying on the down wind side of the beacon. If he is directly overhead and too far up to distinguish color, he can tell the direction of the wind by observing that the flash dims when it revolves to a certain side.

Illuminated Cones Unsatisfactory

The dimming of the flash can be observed at distances either too far above or to one side to determine the color. It is caused by the greater absorption of the beacon's illumination by the colored filter. The only means of indicating wind direction at night at present, it is stated, are those afforded by illuminated "T's" and cones at airports. These devices, it is claimed, are not discernible to pilots except when they are directly above.

It is also pointed out that the ground "T's" employed at the airports are sluggish and do not indicate sudden changes in the wind. Another point of superiority of the colored beam method, it is stated, is that the beacon towers occur at regular intervals along the airways and are usually situated on hills, ridges, and places of eminence so that a device placed on them will record the true direction of the wind. It is contended on the other hand that it is difficult to record the true general wind direction at airports by automatic apparatus because of the cross currents created by the sheds and structures.

Officials of the Air Corps interested in testing the beam coloring device, are desirous of correcting the impression created by press dispatches to the effect that the mechanism was designed for the purpose of automatically flood lighting landing fields. Several press stories were written with an improper understanding of the apparatus, it is stated, and accounts published were wrong.

Install Donaldson Lights at Grosse Isle

DETROIT (MICH.)—The first complete installation of the Airport Lighting, Inc., company's system has been made at the new Grosse Isle Airport here. This is the arrangement devised by John S. Donaldson, vice-president of the concern, featuring location of the lights flush with the ground on each runway so that a plane may be landed along side them, and including also an automatic switching on of the lights on the runway to be used, according to the wind direction, through an electrical connection with the wind cone.

Special virtues claimed for the system are very little glare from the lights, definite indication of the contour of the landing surface, and comparative low cost of operation. The lights, covered with green lenses to distinguish them from obstruction lights, are set in concrete bases about 100 ft. apart. By counting the number of lights, the pilot may estimate the length of the runway. The first light is so placed as to assure the pilot that in gliding toward it for a landing he will have a path clear of obstructions.

A heating provision within each base is expected to prevent snow and ice from obscuring the light. The base and lens are able to withstand scraping of tailskids, according to the company. The lights are designed not so much to illuminate the field as to indicate clearly to the pilot the location of the ground and proper landing area. At Grosse Isle there are three runways 1,500 ft. but eight planned eventually with lengths of about 3,000 ft. A set of experimental and demonstration lights has been installed at Roosevelt Field, L. I., for some time.

Universal Opens Night Service

ST. LOUIS (MO.)—Universal inaugurated its night mail service over the St. Louis Kansas City-Omaha route Oct. 1., giving twice daily service over this line. Connection is made at Omaha with the west- and eastbound transcontinental planes. The Universal machines leave Lambert St. Louis Field at 7:45 p.m. daily and arrive at Omaha about midnight. Planes leave Omaha about 1 a.m. and arrive here at 6:15 a.m. St. Joseph is a stop on the night trip only. Boeing 40 C's having accommodations for four passengers as well as mail, are used. The day service leaves here at 10:30 a.m. and leaves Omaha at 1:10 p.m.

Issue Canadian Airway Map

OTTAWA (ONT.)—The first air map ever compiled in Canada was issued by the geographical section of the Department of National Defence recently. The map covers the air routes of the section from Montreal to Morrisburg, Ont., and is the first sheet of a series which will cover all the air routes of the Dominion. Airports, emergency landing fields and other valuable data are shown.

Issue Sample Field Regulations

WASHINGTON (D.C.)—The latest compilation of suggested uniform field rules developed by the Aeronautics Branch of the Department of Commerce has been printed. These suggested regulations cover arrivals and departures, taxing, repair operations, sparking, etc., and copies may be obtained on application to the Department. Included in the release, designated as Aeronautics Bulletin No. 20, is a suggested city or county aeronautics ordinance.

Studying Air-Rail in Canada

TORONTO (ONT.)—Use of planes as adjuncts to railway operation is being studied by E. W. Beatty, president of the Canadian Pacific Railway, who states he is closely watching the results of certain railway companies which employ planes in this manner. The companies referred to apparently are those in the United States.

Carry Air Mail as Express

FORT WORTH (TEXAS)—In order to speed up air mail originating on points between Dallas and El Paso, a scheme has been devised whereby mail may be carried on Southern Air Transport planes on the Dallas-El Paso passenger planes, wrapped in bundles as express and stamped but uncancelled. The mail is officially mailed and cancelled at the Fort Worth Post Office and from here goes over the regular air mail system. Permission to handle the mail in this fashion has been granted by the Post Office Department. Since there is no air mail system on the El Paso-Dallas route, air mail originating in that area heretofore had to be carried by train, losing about 12 hr.

Public to Share Bellanca Field

NEW CASTLE (DEL.)—The airport adjoining the Bellanca factory here is to be used jointly as a company field and a public airport, according to the terms of an agreement recently consummated between the two interests. It will be known hereafter as the Bellanca Field-Wilmington Airport. The Bellanca company will continue as owner and operator but the field will be available for public use under a set of fees similar to charges made at other private fields open to public use. Bellanca will make additions and improvements in the field service while the Wilmington Chamber of Commerce will install lighting and remove some obstructions.

Specialists View Projected Airports

WASHINGTON (D. C.)—Specialists in the selection of airport sites, construction and maintenance of airports, from the Aeronautics Branch, are now touring various parts of the country to aid municipalities and civic organizations in the furtherance of their airport projects. Itineraries being carried out are given below, and other itineraries covering the states not included are now being planned.

A. Pendleton Taliaferro, Jr., chief of the section, having completed a study at Nashville, Tenn., is covering airports in New York, New England, and the Middle West. Marshall C. Hopkins will travel through Pennsylvania, New York, New England, New Jersey, West Virginia, Ohio, Indiana, Michigan, Wisconsin and Illinois. William J. Mackenzie will cover Colorado, Utah, New Mexico, Texas, Oklahoma, Arkansas, Missouri, Kansas, Nebraska and Iowa. A. H. Wait, after visiting 40 cities in California, will go through Oregon, Washington, Idaho, Montana, Wyoming, North and South Dakota, and Minnesota.

Midcontinent Starts Operation

LOS ANGELES (CAL.)—Nine-hour service between Los Angeles and Denver is now possible through the joint services of Western Air Express and the recently inaugurated Midcontinent Air Express. Planes of Midcontinent Air Express connect at Albuquerque, N. M., with Western Air Express planes flying the Los Angeles-Kansas City route. Flying time is 3 hr. from Denver to Albuquerque, and 6 hr. from Albuquerque to Los Angeles. Midcontinent Air Express also provides daily service between Denver and El Paso, where connections may be made with Standard Air Lines planes flying the Los Angeles-Phoenix-El Paso route, or with Southern Air Transport planes flying between El Paso and Dallas, Tex.

Transcontinental Keeps Schedule

SAN FRANCISCO (CALIF.)—With the exception of but one case of serious delay, the Night Transcontinental mail between this city and Boston was moved during the month of July practically on schedule, which means the loss of only one business day in transit. It is reported that 72 per cent of the mail sent from San Francisco goes over the Night Transcontinental and the balance on the morning plane, which was the only service under the old schedule.

Coastal Changes Schedule

NEW YORK (N. Y.)—Effective Sept. 29, the New York-Albany schedule of Coastal Airways has been changed to the following: Leave here at 8:10 a.m. and 1:40 p.m., arriving at 9:55 a.m. and 3:25 p.m., respectively; leave Albany at 10:30 a.m. and 4 p.m., arriving here at 12:15 p.m. and 5:45 p.m., respectively.

Installing Beacons On Canadian Routes

OTTAWA (ONT.)—Contracts have been let by the Department of National Defense for the lighting of the air mail routes between Windsor and Hamilton, Ont., and between Winnipeg, Man., and Calgary, Alta. The Canadian General Electric Company secured the contract for the erection of the beacons on 50 ft. steel towers. Seventeen will be erected between Winnipeg and Calgary, and five between Hamilton and Windsor.

The Highway Lighthouse Company secured the contract for the installation of 45 acetylene gas beacons on the Winnipeg-Calgary run and nineteen on the Hamilton-Windsor route. Installation work is now proceeding and it is expected that the service between Hamilton and Windsor will be operated at night within a short time. The inauguration of the Winnipeg-Calgary service will take place some time during the late fall. Mail will be flown at night only, and 36 hr. will be saved on postal matter crossing Canada.

Postpone Sprinkler Tests

MIDDLETOWN (PA.)—Tests to determine the efficacy of a sprinkler system to quench fires in airplane hangars, which were to have been made here Sept. 20-21, have been abandoned or postponed indefinitely, according to Maj. J. H. Houghton, commanding officer at the air depot at Olmstead Field. [Plans for the tests were announced in AVIATION magazine Sept. 7.—Ed.]

Name Pass For Eckener

SAN DIEGO (CALIF.)—On Sept. 9 Army, Navy and commercial planes from three local fields flew in a formation for the aerial dedication of Eckener Air Pass. This pass is located about 40 mi. south of San Diego between Jacumba and Mt. San Miguel and has been so dedicated because it was selected by the commander of the Graf Zeppelin on the recent world flight as the most desirable way through the mountain range. The route was recommended by Lieut. Comdr. Charles E. Rosendahl, U.S.N.

Colonial Passenger Traffic Increases

NEW YORK (N. Y.)—A 55 per cent increase in volume of traffic over its New York-Boston passenger service has been reported by Colonial Air Transport. During the first 30 days of operation of the passenger line, beginning April 15, there were 512 passengers. During the period August 15 to August 17 there were 812 passengers. In the five months of service 3,255 passengers have been carried.

On Oct. 1, Colonial Canadian Airways rounded out its first year of service. Reports compiled for the first 11 mos. of operation reveal that during that period 135,718 lb. of mail have been carried and about 201,733 mi. have been flown. This is a monthly average of 12,338 lb. of mail and 19,340 mi. of flying. The line is operated by three pilots and a division superintendent, using Fairchild monoplanes in the service.

San Diego Reports Much Flying Activity

SAN DIEGO (CALIF.) — There are 540 individual aircraft flights daily by military or commercial fliers operating from fields within the city of San Diego, according to a survey recently completed by Howard Morin, of the San Diego Chamber of Commerce. These flights average a total of 391 hr. in the air with a daily total of 26,720 mi. flown, according to the survey. These figures do not include the distance flown by daily air liners operated between Los Angeles and San Diego by Maddux Air Lines, Continental Air Express, Pickwick Airways, and Western Air Express.

In listing the activities of these transport planes Mr. Morin's report shows that an average of 390 tri-engined transports land at Ryan Field, San Diego, each month; that during August, 1929, 121 tri-engined transport planes checked in at Ryan Field either from or en route to Mexico or Central America, and that more than 6,000 passengers arrived at or left from Ryan Field over regular transport lines during the month of August.

Daily flight records for the month of August as revealed by the Chamber of Commerce survey are: Naval air station, North Island, daily flights, 60; daily flight hours, 55; total daily mileage, 4,550 Pacific fleet air force, average daily flights at San Diego, 250; daily flight hours, 250, total daily mileage, 15,000. Rockwell Field, average daily flights, 100; daily flight hours, 30; total daily mileage, 3,000. Ryan Airport, daily flights including students and passengers, 80; daily flight hours, 21; daily mileage, 1,700. Lindbergh Field, average daily flights, 50; daily flight hours, 25; total daily mileage, 2,000.

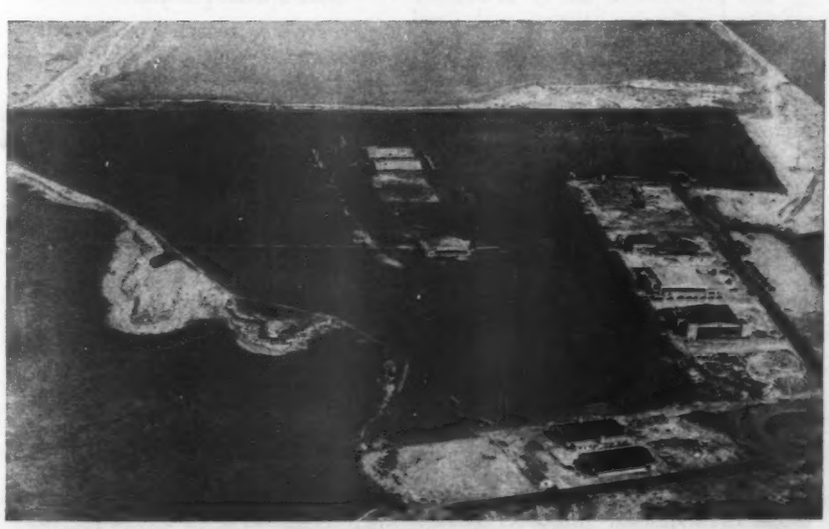
A Traffic Promotion Wrinkle

MINNEAPOLIS (MINN.)—A guest registers at a local hotel from Chicago, or from points which would be reached from here via Chicago, and the Consolidated Air Passenger Bureau, scanning the register, decides this guest is a prospective traveller by air. "How are you going back? Have you stopped to consider the time you can save by using the airways on your return trip," are the first questions in a letter which the bureau at once sends to the guest. There follows a statement of the schedule of the Northwest Airways service between the two cities. Similar information is advanced, of course, for other lines radiating from the city in the direction which the guest is likely to take when he departs.

Propose N. Y. Curtis Memorial

HAMMONDSPORT (N. Y.)—A memorial field, to be called the Curtiss Commemorative Airport, has been proposed here where between 1908 and 1914 much of the experimental work and early flying of Glenn Curtiss was done.

Boston Airport Development Progresses



RECENT photograph of the Boston Municipal Airport, now being extensively improved. In the center are the National Guard and old Curtiss hangars, which will be moved to one side of the airport, leaving the entire field clear. The top building of the new hangars on the right of the picture is the steel Colonial Air Transport building. Next is the Skyways headquarters and next to that the new Curtiss Flying Service hangar. The administration building is that last in that row and private hangar occupy foreground.

AIRPORT CONSTRUCTION PROJECTS

DREDGING operations in the Lindbergh Field area at San Diego are expected to be completed on Dec. 1 at which time 2,600,000 cu. yd. of earth will have been pumped from the harbor bottom and dumped on tidelands to reclaim 142 acres of land, of which 125 acres are on Lindbergh Field proper. The field is now in use on a small scale but will be much more widely used shortly after the first of the year when surfacing of the newly filled land is completed. Adequate facilities for seaplane operations are provided at Lindbergh Field as well as for the operations of land planes. It will be an all way field of circular shape when completed.

Tarbox Aviation Company, Albion, N. Y., expects to take over the Batavia (N. Y.) Government emergency landing field which is nearing completion. Installation of lighting equipment is now in progress and additional facilities are to be established. Construction of another experimental runway 100 x 1,350 ft., extending from southeast to northwest at Lambert-St. Louis Field, has been approved by the airport commission. The new runway is to cost $18,000. Eight runways are planned in all. A 450 ft. section of the new runway will be constructed of asphalt, with an earth base 3 in. thick and a bituminous wearing surface 1 in. thick. Another section will be made of macadam, coated with asphalt. A third section of the same length will be of concrete. A drainage appropriation of $700 also was voted.

Plan Army Unit at Long Beach, Calif.

The Ozark Club of St. Louis, Mo., plans establishment of an airport in connection with its country club. The Fairfax Airports, Inc., of Lincoln, Neb., has leased the St. Joseph (Mo.) Municipal Airport and plan to develop it further. The Curtiss Flying Service is understood to be about to establish a $70,000 airport near Britton, Okla., under the management of B. S. Graham. Sumter, S. C., has leased a 152-acre tract on which to establish a municipal airport. Plans are being completed by G. W. Firth, a structural engineer for a $48,000 hangar and administration building at the Long Beach (Calif.) Municipal Airport for the Air Corps.

McAllen, Tex., has bought a 123-acre airport site for $25,000 and has appropriated $5,000 for leveling and clearing the land. Tampa, Fla., will vote in November on a bond issue of $500,000 for airport work. Of this sum $350,000 will be for the purchase of a site, clearing, filling and drainage; $100,000 for hangars, lighting and other equipment, and $50,000 for improvement of the present municipal field. The site has been chosen with regard to suitability for land and water planes and airships.

A proposal in Cedar Rapids, Ia., to bond the city to the extent of $180,000 for the purchase and development of a municipal airport was defeated in a recent election. It is said that the Flagler Beach (Fla.) Airport will be completed this month. The Watonga (Okla.) Aero Club has been formed to sponsor the establishment of a modern airport. It is reported that the work on the Alva (Okla.) Airport for Western Air Express has been expedited by the preliminary work already done by the Alva Chamber of Commerce. The sum of $5,000 has been appropriated by the Waltham (Mass.) City Council for initial work on a municipal airport.

Awarding of contracts for the improvement of the seaplane base at Buffalo for the erection of two hangars has been held up pending indication from air line operators located there as to what demand there is for such conveniences and the amount that they would pay. The project involves about $174,000. Colonial Airways hangar at Albany, N. Y., costing $70,000, was to be dedicated Oct. 1. In the meantime Colonial hangars are nearing completion at Newark and at the Boston Municipal Airport.

Completing Atlanta Runway

Grading and sodding of a large new runway system is nearing completion at Candler Field, Atlanta, Ga. There will be four runways, 2,600 x 500 ft. sodded with Bermuda grass. The north and south runway is to be extended to 3,600 ft. Two sailing ships have been sold by the Robert Dollar company to the Alameda (Calif.) Airport and these will be filled with rock and concrete and used as breakwaters and living quarters. This is to take the place of several hundred feet of breakwater and bulkheading necessary to take care of the expansion at the port.

Curtiss Flying Service, Inc., has leased the Columbia (S. C.) Municipal Airport for a rental fee of $1,000 per year and will add hangars and some improvements soon. In order to facilitate shipments to the Los Angeles Metropolitan Airport by rail the spur siding has been designated as the L. A. Metro Switch and this title will appear on maps and listings of the Southern Pacific Company. This will afford direct shipment and other conveniences to the airport operators.

To Bridge Portland Tracks

A concrete overhead crossing to the Port of Portland Airport is to be built by the City of Portland, Ore., Multnomah County, and the O.W.R.&N. Railway, over whose tracks the bridge will be built. The cost will be about $222,000. The aviation commission of Meriden, Conn., has voted to ask for $100,000 in the city's 1929-1930 budget to develop the municipal airport. Included in this cost would be the purchase of additional property, grading the entire tract, covering a brook and installing border lights.

Initiating a $75,000 building program, National Airways, of Detroit, has let contracts for the construction of the first of three 80 x 52 ft. hangars erected at its field at the corner of Plymouth and Middlebelt roads. It is expected that operations may be started at the United Airport at Burbank, Calif., about the middle of October. Pacific Air Transport will begin using the field then as its southern base.

The last of the 360-ton semi-circular arches on the main section of the huge Goodyear - Zeppelin Corporation airship hangar at Akron Municipal Airport has been put in place. It is expected that the entire building will be completed by the end of this month. A Neon metal wind indicator measuring 16x10 ft. and turning on a ball bearing stem, has been installed on the control tower at the Boston Municipal Airport.

Steinberg Project Progressing

The Hannibal (Mo.) Chamber of Commerce has prepared plans for an airport, including hangar, shops, runways and lighting. Meridian (Miss.) has voted $75,000 for airport development work. The Three Forks (Mont.) Airport is being equipped with three oil cinder runways. The Medina (N. Y.) Society for the Promotion of Aviation has plans for construction of a $50,000 airport to serve that city. Newburgh (N. Y.) has retained the American Airports Corporation to design an airport.

It is said that the Curtiss-Steinberg airport, St. Louis, will be dedicated Nov. 15. About $3,000,000 will be spent eventually on the 450-acre tract. Foundations for three of the eight proposed hangars have been laid and grading and drainage are in process. Contracts are about to be let for a dormitory, terminal building and cafeteria. About 200 acres of the field are now available. Future plans, probably to be realized next year, include a hotel, two large machine shops, weather bureau, control tower and a number of smaller structures.

Finish Omaha Drainage System

Progress is reported on the Kinsolving Field project at Abilene, Tex., under the auspices of the B. Russell Shaw Company, and it is expected that it will be dedicated Nov. 15. It is being developed under a $100,000 bond issue as a municipal project.

Pipe for the drainage system at the Omaha (Neb.) Municipal Airport has been completely installed. About 18,700 ft. of 6 in. tile, 1,180 ft. of 16 in. tile, and 780 ft. of 18 in. and 700 ft. of 30 in. tile were placed beneath two of the three runways. The third runway will be drained by a sub-surface rock. Oiling of the runways will be started soon.

At Cram Field, Davenport, Ia., construction has been started on the new 100 x 60 concrete block hangar. This is to be built by the John Soller Construction Company, of Davenport.

Receiving Sets on Some Boeings

OMAHA (NEB.)—All Boeing planes flying in and out of Omaha have been equipped with radio receiving sets for communication with ground stations, it was announced recently. As soon as they can be fitted, all the mail planes will carry transmitting sets also.

FOREIGN ACTIVITIES

Australian Club Plans Country Club Project

SYDNEY (AUSTRALIA)—The Aero Club of New South Wales has worked out a plan whereby it will acquire a 209-acre airport and form a combined flying and country club. The location will be approximately 19 mi. from the center of Sydney, and conveniently reached by road and rail, both of which are on the boundaries of the field. The scheme is estimated to require an outlay of about $250,000, and includes the erection of a modern residential club house, hangars, with private lockup sections for members' own machines, as well as workshops equipped with modern machinery.

The flying section of the Club has been in operation for just three years, and during that time has increased its membership from 60 to over 800, of whom 240 are flying members. Two full-time instructors are employed, and during the last 12 mos. 58 pupils obtained their "A" licenses, as against 43 the previous year. The average weekly flying time is 94 hr.

Meantime, flying operations are carried out on the local flying field owned by the Defense Department at Mascot, but with the phenomenal increase in commercial flying activities which make it unsafe for training operations, the Club has found it necessary to go further afield and acquire its own property where the interests of the members will be paramount.

An 18-hole golf course is also being laid out. The club fleet consists of two Avro Avians, one Westland Widgeon, eight D H Moths, and a D H 9 powered with an Armstrong Siddley Puma engine, which has recently been acquired from the Defense Department. The D H 9 will be used for training pupils on heavy types.

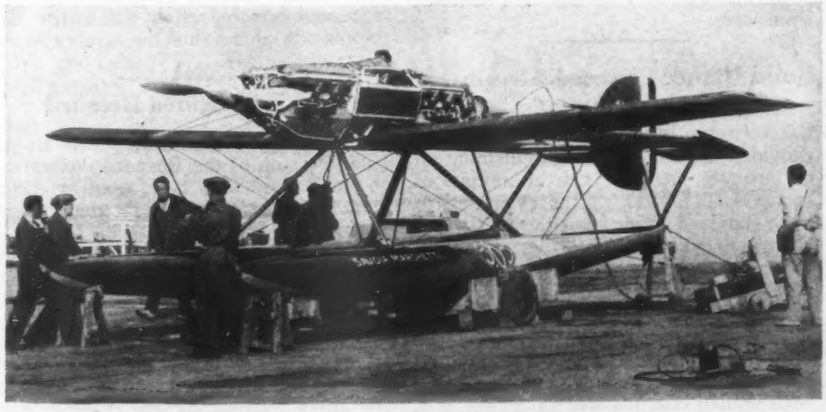
New Altitude Records Homologated

PARIS (FRANCE)—The F.A.I. has just homologated two altitude records recently made by M. Burtin, flying a Breguet 19 metal sesquiplane, fitted with a 500-hp Farman engine and mechanical Rateau supercharger. With a load of 1,102.31 lb., the altitude reached was 9,374 m. (nearly 31,000 ft.), and with a 2,204.12 lb. load, 8,089 m (about 26,500 ft.). The system of supercharger used is a new and very interesting development of very high mechanical ingenuity.

French Hold Contest For Improved Fuels

PARIS (FRANCE)—The Comité Française de Propagande Aeronautique (French Committee for Aeronautical Propaganda) has just decided to promote a competition with a view of improving the existing aviation power units. The Air Ministry has given its support to the idea, as well as the Aviation Committee of the Aéro-Club de France. The successful competitors will be awarded premiums varying between $782 and about $7,820, the total not exceeding $9,775. The competitors must be of French nationality.

The practical trials are to be made on engines suitable for present day requirements. The appliances or products included in the competition are as follows: 1, Fuels; 2, separate carburation devices; 3, devices comprising special fuels and special carbureters adapted for their use on existing engines; 4, devices comprising special fuels, special carbureters and special engines; 5, any device trapping backfires or annihilating their dangers. The main object of the competition is to promote researches for the use of non-inflammable fuels, without sacrificing the performance compared with present gasoline.



The Savoia Machetti with engine cowlings removed, one of the most interesting of the machines evolved for the Schneider Contest

Twin-Engined Savoia Racing Plane Described

CALSHOT (ENGLAND)—One of the most interesting of the aircraft developed for the Schneider Trophy Contest was the Italian twin-engined Savoia Marchetti fitted with two Isotta Fraschini engines. It was erected here by the Italian team but was not flown.

It has much that is original in its design and the photograph shows clearly how the crankcase of the Isotta Fraschini engines is moulded to a streamline shape and is its own engine bearer. The strengthening ribs on the crankcase can be seen clearly, and it will be realized that cutting off the engine straight in order to mount it up against the fireproof bulkhead has meant the arrangement of all the auxiliaries on the nose of the unit. An abnormally long propeller shaft was a distinctive feature but no attempt had been made to introduce reduction gearing. The radiators on each side of the cockpit were for oil, and the cockpit itself seemed rather cramped. Sliding pedals instead of a rocking bar were used for the rudder under the compulsion of restricted space, and the control column was curved in shape.

The twin floats were not each a completely independent unit in the water lines, but the curves of the underside if continued would have met under the centerline of the machine, the assumption being presumably that their water resistance and action would be that of a gigantic single float. Whether the water would so obligingly conform to an imaginary curve between the floats there was no opportunity of judging. A little metal deflector plate was fixed on the inside of each float side to throw the water down from the rear airscrew.

While at Calshot the engines were run up but it is believed that both engines were never run simultaneously. It is understood that each engine is to develop 1,750 hp. ultimately, and with a total of 3,500 hp. this machine may yet accomplish some notable performances, but judging from English experiences much experiment will be needed to insure that oil and water temperatures remain within reasonable limits.

Scadta Increases Service

BUENAVENTURA (COLUMBIA) — Scadta inaugurated Aug. 30 a second weekly trip between here and Cristobal, C. Z. A weekly trip has been operated since the middle of April. Mail and passengers are carried in Junkers F 13 single engined low wing monoplanes and twin engined Dornier Wals. Planes leave here Wednesday and Friday and Cristobal on Thursday and Saturday

Foreign News Briefs

A high altitude plane manned by a pilot and meteorologist will be used at Munich, Germany, to make regular observations of upper air conditions.

Passenger traffic at Tempelhof (Berlin) Airport dropped about 21 per cent during the first half of this year. Volume of baggage dropped about 21 per cent, while freight increased about 7 per cent. Bad weather and elimination of several lines on account of decreased subsidy are blamed for this. There was considerable improvement during July.

Imperial Airways has definitely abandoned other than three-engined planes on its cross-Channel passenger services.

Additional firms are said to be involved in the merger negotiations which already have included Societe Lorraine, Societe Anonyme Nieuport-Delage and Avions R. Hanriot, in Paris.

The Argus Motor Works, of Berlin, is reported to have developed a new inverted four-cylinder, air-cooled, inline engine, which develops 80 h.p. at 1,400 r.p.m. Each cylinder has two overhead valves. All valves and push rods are enclosed.

A fund is being raised among governors of the 28 Mexican states for the purchase of seaplanes for the Mexican Navy.

Aeronautical Transport Corporation is to operate three times a week, instead of twice as at present, over its Mexico City-El Paso line on account of demand for passenger and mail accommodations.

Improvements on the Junkers Diesel Engine, designated as the "S L 1," enable it to develop 350 h.p., and fuel consumption has been lowered.

During more than five years of operation, the Czechoslovakian state air lines have not had a serious accident. During 1928, there were two forced landings. The Czechoslovakian Air Traffic Company finished 1928, its first year of operation, without any accident, but during the first half of this year had one fatal crash.

A new Diesel type of engine has been developed by Jonas Hesselman, a Stockholm civil engineer. An Anglo-Swedish company has been organized to exploit it.

Northern Air Lines has discontinued transportation of passengers on its Manchester-Dublin and Belfast-Douglas routes until tri-engined planes have been installed. Mail and freight will be carried across the Irish Sea as heretofore.

Following assertions of Capt. Albin Ahrenberg, commander of the ill-fated attempt to fly from Sweden to North America by way of Iceland and Greenland, that his engine developed bad defects, an investigation is being made to determine its exact condition.

It is planned to extend the London-Karachi mail and passenger service to Australia next year, it was stated at the annual meeting of Imperial Airways in London recently. This would bring England and Australia within sixteen days of each other.

A new eight-passenger transport of the Compangine Generale Aeropostale recently flew, non-stop, from Paris to Madrid in 5 hr. 11 min. Jules Vedrines was the pilot.

A Short Calcutta flying boat ordered by the French Government has been delivered.

During the week ending Sept. 7 a total of about 1,611 passengers were carried across the English Channel. About 1,000 of these were transported by Imperial Airways.

The Far East Aviation Company of Hong Kong, China, has started a seaplane flying club and is looking for an instructor. Salary has been set at about $9,000.

Recent agreements between Poland and Germany make possible German operations over Poland and landings at certain points.

A chair of aviation has been established by the University of Paris at the College of France.

Because of a tendency for students at Cambridge University owning their own planes to cut classes, an order has been issued forbidding morning flights without special permission.

General Balbo, Italian Air Minister, is preparing a flight from Rome to this country, with himself as chief pilot.

Because of the general lack of suitable landing fields in the Azores, on account of which the islands have been called the "graveyard of aviators," Portugal is taking steps to install an airport system there.

During the last six years, 241,184 mi. have been flown, 3,696 passengers have been carried and 64,711 tons of merchandise have been transported on the six lines serving the interior of Siam, according to the Department of Commerce.

Night air mail service was started on Oct. 1 by K. L. M. between Brussels and London. Similar service between Brussels and Cologne is under consideration.

The Rome-Milan-Turin airline has been opened with tri-engined Fokker transports.

Build Higher Powered Klemm

BERLIN (GERMANY) — The Klemm factory recently brought out a new type provided especially for the installation of stronger engines with an output of between 70 to 100 h.p. as compared to the standard type with 40-50 h.p. Salmson engine. The plane has on principle the same cellule as the older type L 25 Ia, but the dimensions of the fuselage and arrangement of the cockpits are suited particularly to the use of the plane for touring, training and stunt flying. The two seats are equipped with double controls and parachute box. The landing gear is stronger.

French Aero Club Holds Seaplane Meet

LA BAULE (FRANCE)—The Aero-Club de France staged Sept. 14 and 15 a seaplane meet here, the big seaside resort on the Atlantic coast, six miles west of St. Nazaire. One of the features was the first public demonstration of the use of artificial smoke clouds for hiding the retreat of Navy fighting boats. Bombing exercises with actual projectiles constituted another popular feature.

The sporting side comprised a Rally, the main event of which was won by a genuine amateur, M. Bernard de Précourt, flying his own machine, a Schreck amphibion powered with a 180-hp. Hispano-Suiza engine. With two passengers, he covered 750 mi., making five officially observed stops and gaining 24,490 points. M. Challe, on another type of Schreck amphibion, powered with 450-hp. Lorraine, was second.

A handicap race over 62 mi. was won by M. Tanguy, on a Schreck (180-hp. Hispano) belonging to M. Villiers. Pilot-Engineer Paumier, the designer of Schreck machines, was second on one of his productions.

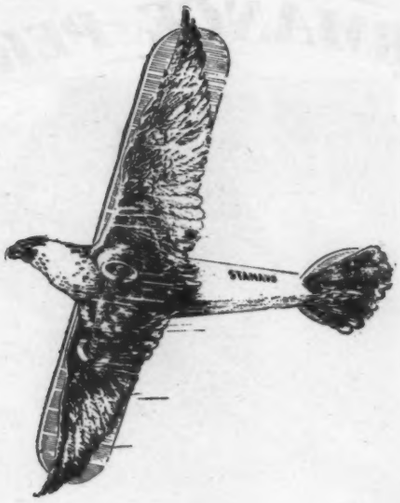
It was planned to include a fast scratch race for machines averaging more than 250 m.p.h. Unfortunately, the date was too near the recent Schneider Trophy Contest, and neither the British nor the Italian racing machines entered, so the proposal had to be abandoned.

Plane Speeds Ship's Mail

GALWAY (IRELAND)—A plan for further speeding up of mails arriving in Europe by steamship from the United States was started Aug. 25 by co-operation between the North German Lloyd steamer Karlsruhe and two pilots, Col. Charles Russell and Jay Summers, of Vickers, Ltd., using a Vickers Vixen with a Rolls Royce engine. Mails transferred from the steamship here, and the pilots took off for Croydon, where they landed 4 hr. later. Mail reached the London post office 36 hr. earlier than otherwise. Berlin mail was carried on to Berlin by Luft Hansa plane, the mail arriving 60 hr. earlier than usual. This is considered quite a successful demonstration, and further developments along this line are expected soon.

Develop Tri-Engined Bernard

LeBOURGET (FRANCE)—A tri-engined version of the Bernard monoplane of the Yellow Bird type, used by Assolant, LeFevre and Lotti in their trans-Atlantic flight, has appeared here. In place of the 500 hp. Hispano-Suiza water-cooled engine used on the Yellow Bird, this machine has a Gnome Rhone Jupiter of 450 hp. in the nose and two 250 hp. wing engines. Speed at 3,280 ft. is between 124 and 133 m.p.h. Four passengers are carried as compared with the three carried by the Yellow Bird type. It has a wing spread of 82 ft.



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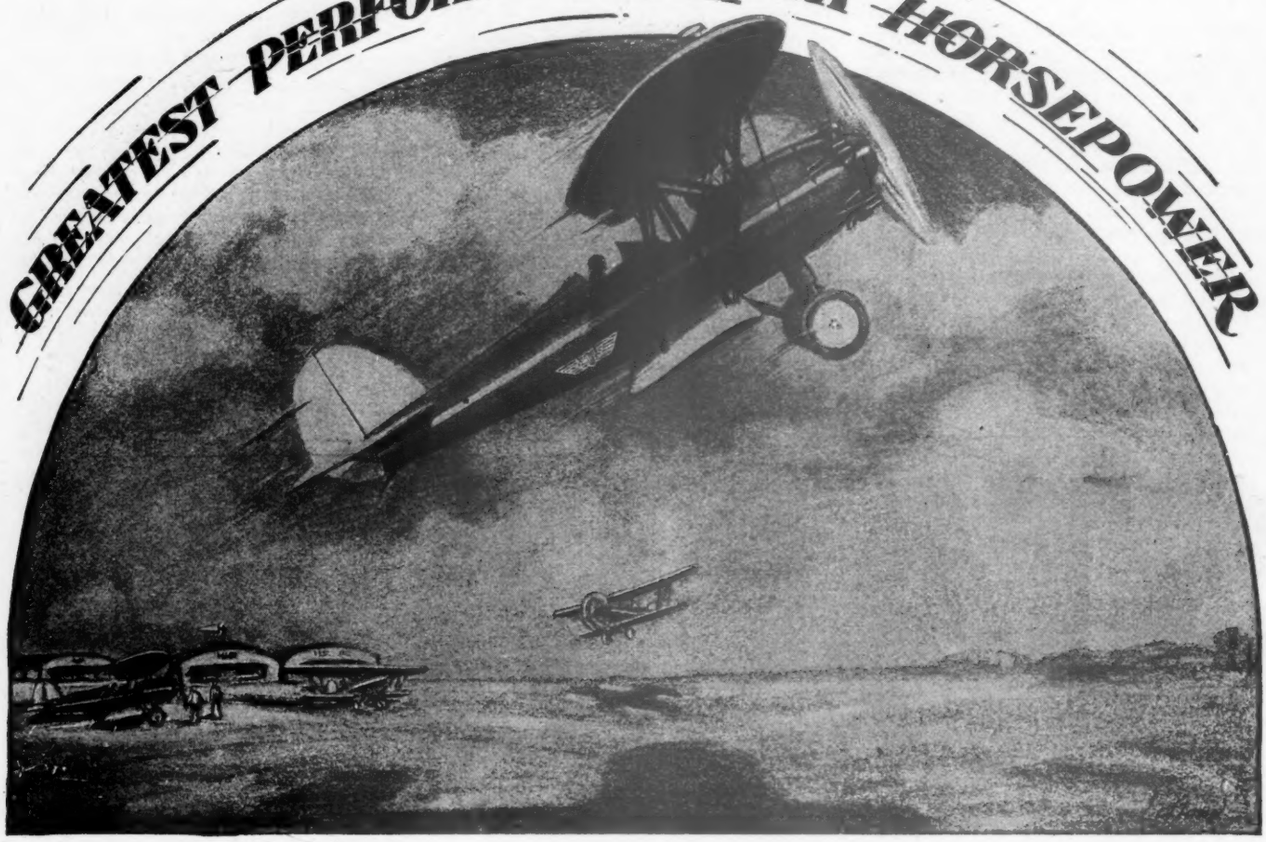

Dual control with front unit quickly detachable for passenger carrying.

Landing gear split axle type with combination oleo rubber shock absorbers.

Perfection in aileron design. There has been no cheapening in simplifying.

Metal turtle-deck from front to rear allowing ease of internal inspection.

TO achieve the greatest of all performances in the popular-priced class, the Kinner has been introduced as standard BIRD equipment.

Low maintenance cost, uniform performance, the highest possible safety factor and its many other features, expected only in planes of the highest price, are winning more pilots for the BIRD every day. *Fly one today!*

The first entry to be tested in the Guggenheim Safety Contest now running.

Stability perfected to a degree allowing for fool-proof student training.

Chrome Molybdenum tubing throughout assuring highest safety factor 8 plus.

The wing design permits performance comparable to slotted wings. Will not spin.

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17 Haverkamp St., Brooklyn, N. Y.

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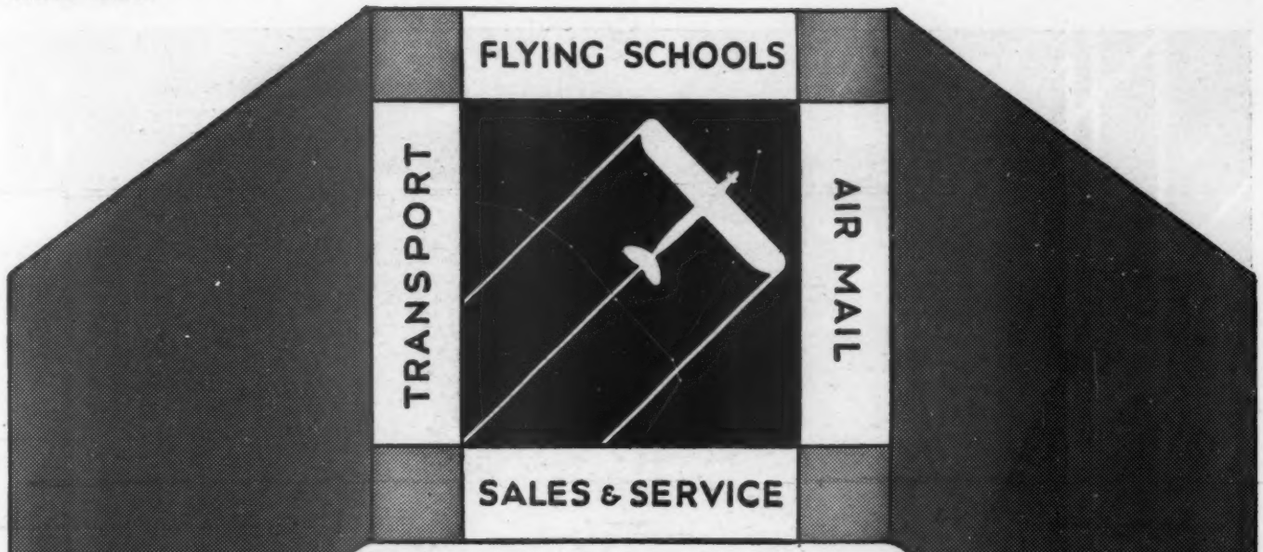
Safety with Performance



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Rapidly throughout New York State and New England, Colonial dealer franchises are being secured by business men who see the profit possibilities in the sale of planes.

The market for the sale of planes is definitely known and is expanding. It includes: (a) training schools and student fliers; (b) business organizations; (c) private owners, and (d) operators for charter service and passenger hopping.

The line of planes distributed by Colonial Flying Service is too well known to require much comment. It includes those makes best suited to the demands of the volume market. FLEET, CHALLENGER, FAIRCHILD, PITCAIRN and STANDARD aeroplanes are distributed by Colonial Flying Service through New York State and New England.

A Colonial dealer has available to him a fund of practical information which is the result of Colonial experience in the successful operation of Air Mail and Air Transport lines.

Any service demands made by a dealer of his customers are easily met through the chain of Colonial Service stations located at strategic points in New York State and New England.

District sales offices are located at Boston, Buffalo, Hartford and Schenectady. Service facilities are also available at Newark, Albany, Utica, Rochester, Cleveland and Toronto and Montreal, Canada.

For complete information as to territories available and conditions for securing a sales agency, write to Colonial Flying Service, Inc., 270 Madison Avenue, New York City.

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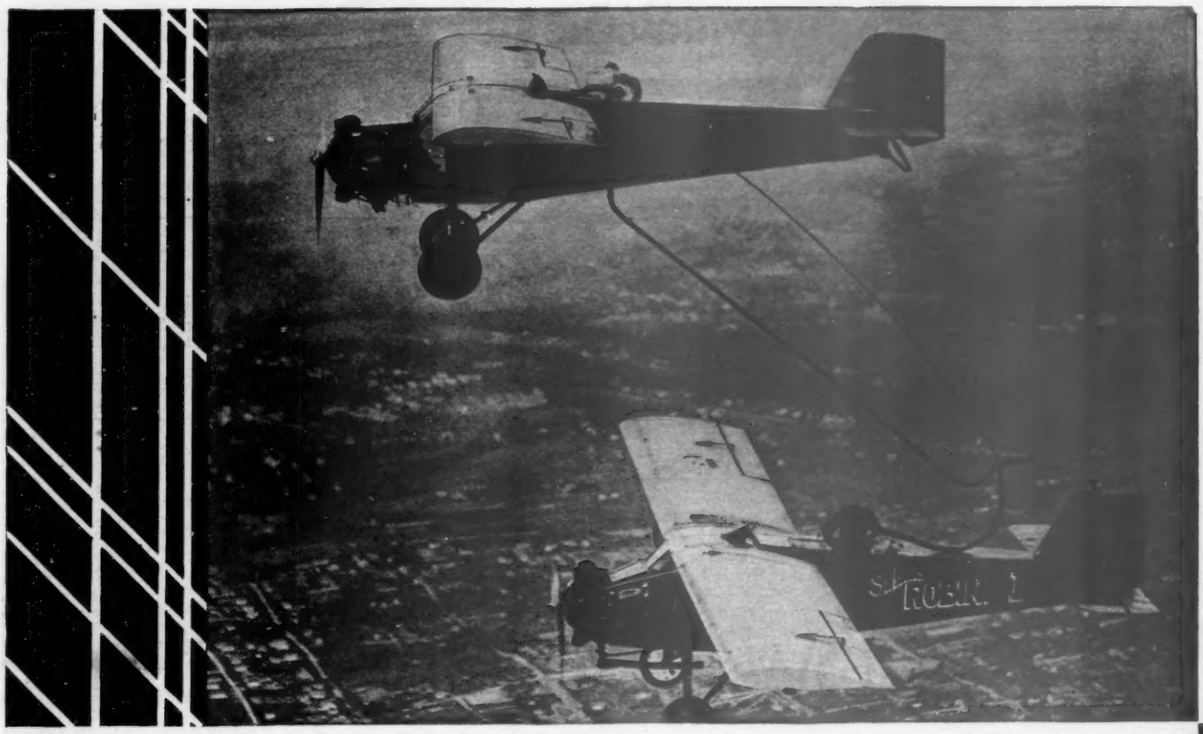

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420 hours and 21 minutes in the air, consuming throughout 3,190 gallons of Naturaline. That's the phenomenal record of the St. Louis Robin I, completed on the evening of July 30.

Two wonderful pilots, a wonderful engine, a faithful and capable refueling crew, and *Naturaline* made the combination that bettered the previous world's record by 173 hours, 37 minutes, and 28 seconds.

Naturaline was used throughout with such satisfying results to the flyers that when their trained ears detected a falter they asked immediately if Naturaline was being furnished as before. This great endurance flight, coupled with the known worth of Naturaline as a speed fuel, establish it as the aviation fuel par excellence.

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NATURALINE
THE SUPER AVIATION MOTOR FUEL

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Naturaline's speed performance was conclusively demonstrated at the Gardner Cup Races held at St. Louis May 30th. Bringing home the first four planes in competition with five other gasoline brands. The picture above is that of "Speed" Holman, the winner, who enthusiastically endorses Naturaline.

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If you are going to build an airport, a landing field, or purchase one or more planes, you need this new Bulletin on Firesafe, Steel HANGARS.

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Now EQUIPPED
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DETACHABLE BACK-PAD

The Russell "Lobe" Parachute fits right into the seat—and this new detachable BACK-PAD holds the harness in position while forming an additional cushion for greater comfort.

You fasten and unfasten the parachute harness while you are seated in the cockpit--in the same manner as you snap the safety belt. It's all very simple and practical . . . . . An indication of the many other refinements you will find in the Russell "Lobe" Parachute.

Famous flyers, air transport companies, training schools, individual flyers and aerial passengers the world over have adopted the Russell "Lobe" Parachute as standard flight equipment.

In an emergency you simply pull the release ring —the Russell "Lobe" Parachute does the rest . . . . . It has a record of 100% efficiency in use!

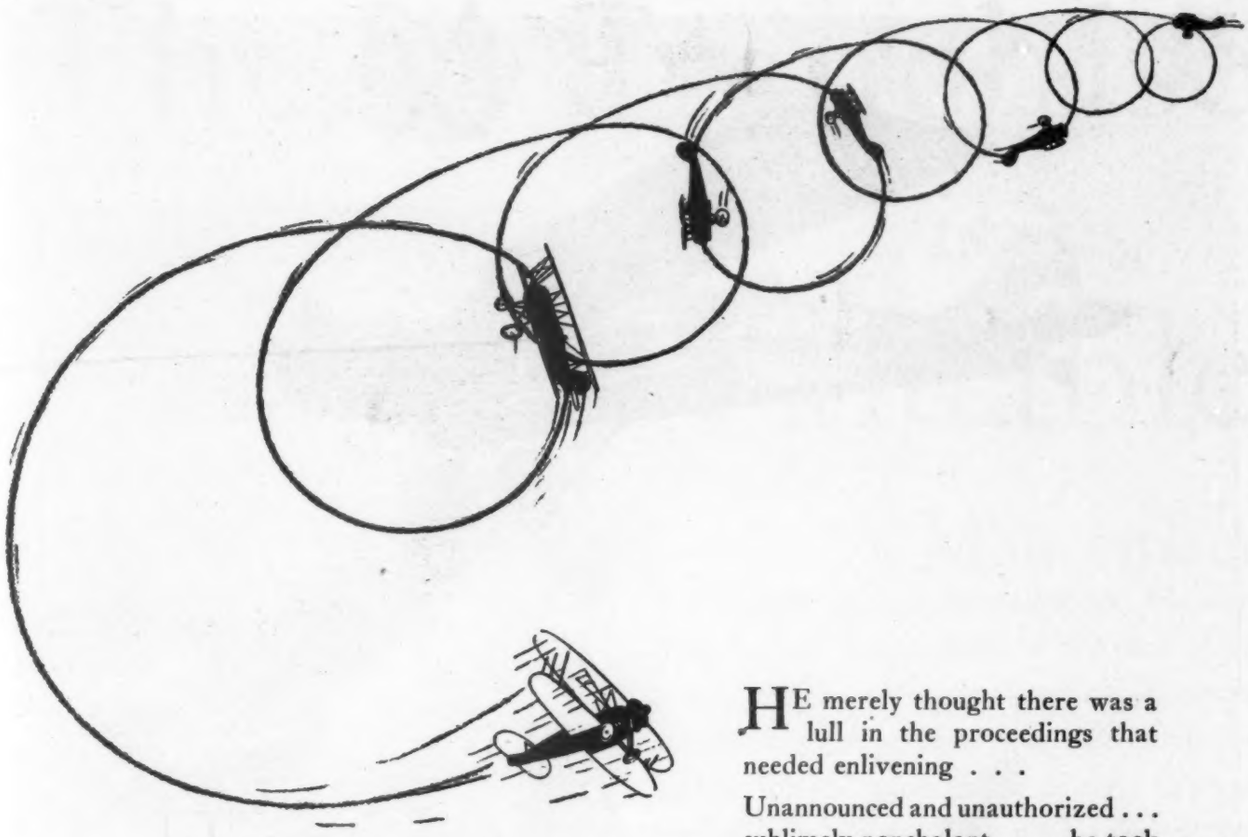
Veteran air men prefer this aerial life-saver because it has no springs, no rubber bands, no pilot chute—nothing to deteriorate, nothing to get out of order.

Ask about the new Russell "Lobe" Pongee Silk Parachutes, selling at $275. Other Models, $250 to $350.

Descriptive Folder and Name of Nearest Service Station and Dealer on Request.

Russell Parachute Company
1202 Kettner Blvd. San Diego, California

Eastern Sales Office: 122 E. 42nd St., New York City



HE merely thought there was a lull in the proceedings that needed enlivening . . .

Unannounced and unauthorized . . . sublimely nonchalant . . . he took to the air again in his borrowed WACO Taper-Wing and pulled off the real thrill of the meet for the benefit of those stragglers on the Field that evening at Cleveland . . . proceeded to do a whole row of outside loops . . . *seven* of them . . . in immediate succession.

Nobody ever heard of such a thing.

Of course, he was "grounded" for the extemporaneous contribution to the list of events . . . like the gendarme of old whom Napoleon decorated for valor and executed for insubordination.

But R. W. Mackie had proved to himself . . . and to some few thousands of onlookers . . . that the WACO Taper-Wing is absolutely in a class by itself.

You probably wouldn't want to do it . . . even if they didn't ground you for it . . . but you like to know the ship is built that way.

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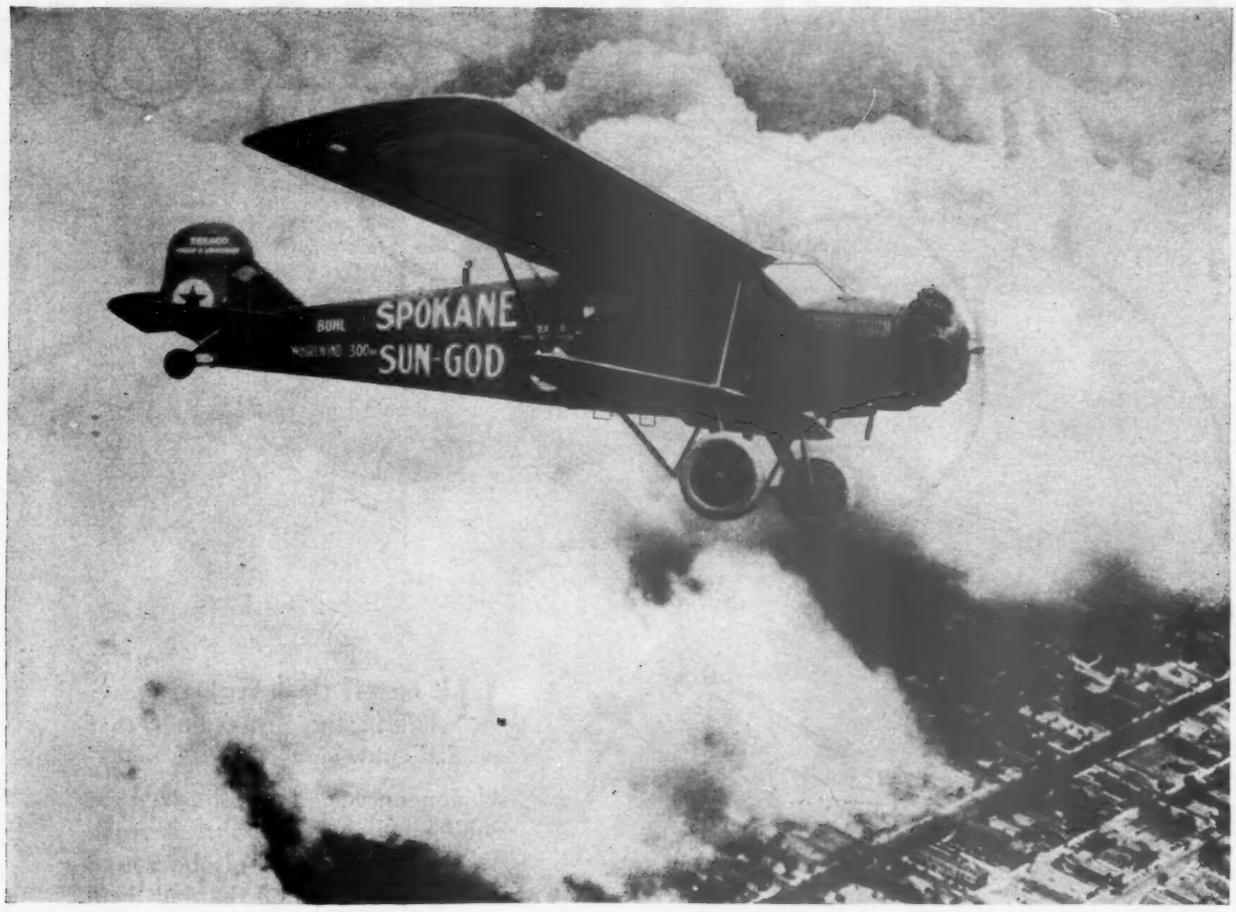

A RECORD AND A WIRE

Spokane, Wash.
August 21st, 1929

Successfully completed ocean to ocean nonstop refueling flight covering more than seventy two hundred miles stop Please accept our sincere congratulations to the Buhl Aircraft Company and its engineer in designing a ship which possesses such remarkable features of durability stability and comfort stop Its performance at high altitudes under varying weather conditions carrying heavy overload of eight hundred pounds was noncomparable stop Accommodations in cabin in spite of extra tanks gave us much needed space for moving about and sleeping stop Words cannot express our appreciation of the ship itself and for our many needs which were foreseen and provided for by your company stop With best personal wishes

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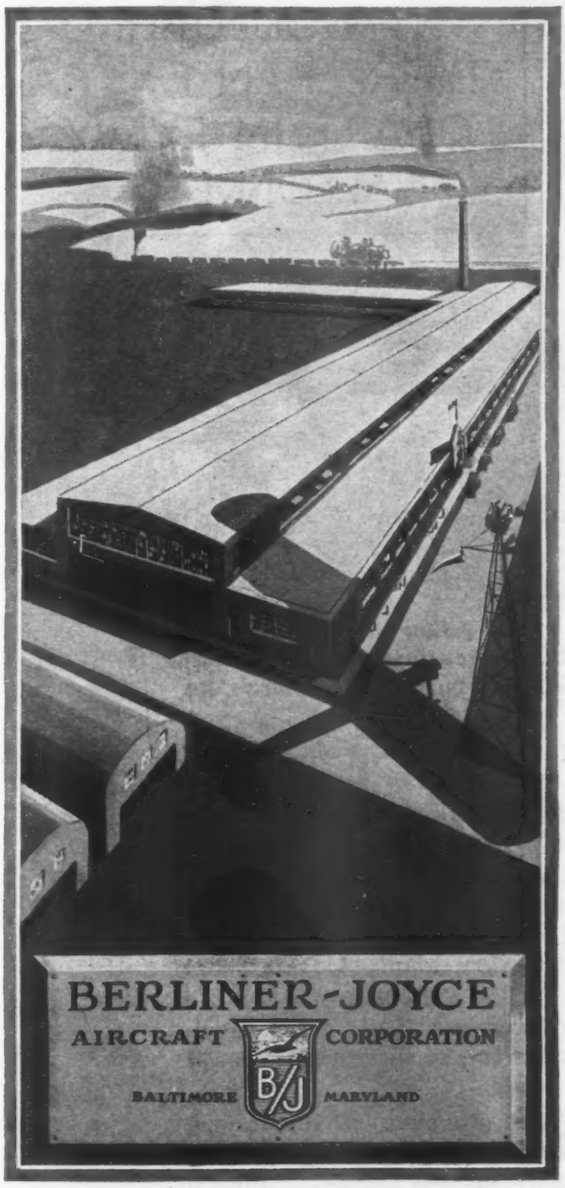
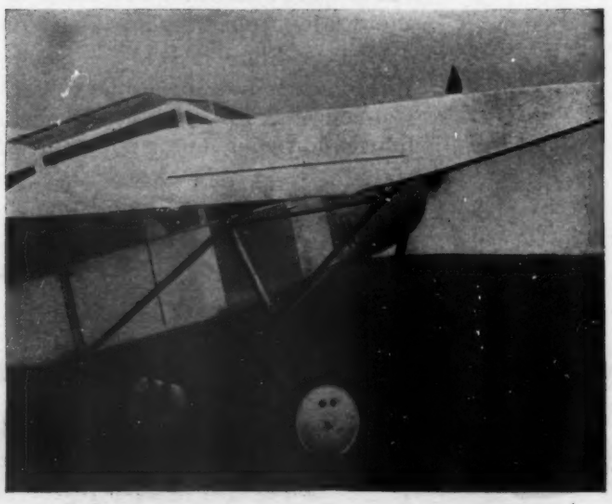
MARYSVILLE, MICHIGAN

The B/J Franchise *is* Valuable



Man Power

is the secret of salespower for the B/J distributor and dealer. Back of the B/J plane is the weight of a great staff of foremost aircraft engineers. They were gathered together for the pioneering of new designs for military planes. This same original designing is carried into the B/J commercial planes, truly destined to be pacemakers of the air. Every B/J distributor and dealer knows that back of the plane he sells is an engineering staff that is making history for the planes they build, and permanent profits for the dealer. Some distributor territories are open. . . . . Write for information.



AN ENCLOSED PLANE without a blind spot! The illustration at the right shows the modified high wing construction of the new B/J two place monoplane which affords the pilot full vision both above and below the wing. Built in a new, quarter-million dollar plant at Baltimore, with every facility for high-quality, low-cost production, the new B/J will set new standards in salability as well as in ease of handling and safe, comfortable, carefree flying. For information write to G. Roger Coats, Sales Manager, Berliner-Joyce Aircraft Corp,, Baltimore, Md.

THE reason for the extra quart in every gallon of Quaker State Aero Oil is the reason why Quaker State gives the smoothest, sweetest lubrication that ever kept an airplane motor purring! And here's the reason . . . .

Quaker State Aero Oil is made differently from ordinary oils, different entirely.

Ordinary refining leaves in every gallon of oil, a quart or more of material that has little or no value in lubricating a motor. It is a quart of waste.

But Quaker State is not refined in the ordinary way. It is *super*-refined —carried a step further than ordinary oils. And this "extra step" removes the quart of waste that ordinary refining leaves in. In its place you get a quart of *lubricant*—you get an *extra* quart in every gallon of Quaker State.

And here's another important thing—Ouaker State Aero Oil is made from the very finest crude oil that Nature produces, 100% Pure Pennsylvania Grade Crude—the value of which is two or three times that of the crudes from which ordinary oils are made.

Quaker State is sold everywhere—there are over 600 distributing warehouses and more than 80,000 dealers in the United States and Canada. Ask for it at your airport and you'll get the smoothest, silkiest lubrication your motor ever purred over!

QUAKER STATE AERO OIL

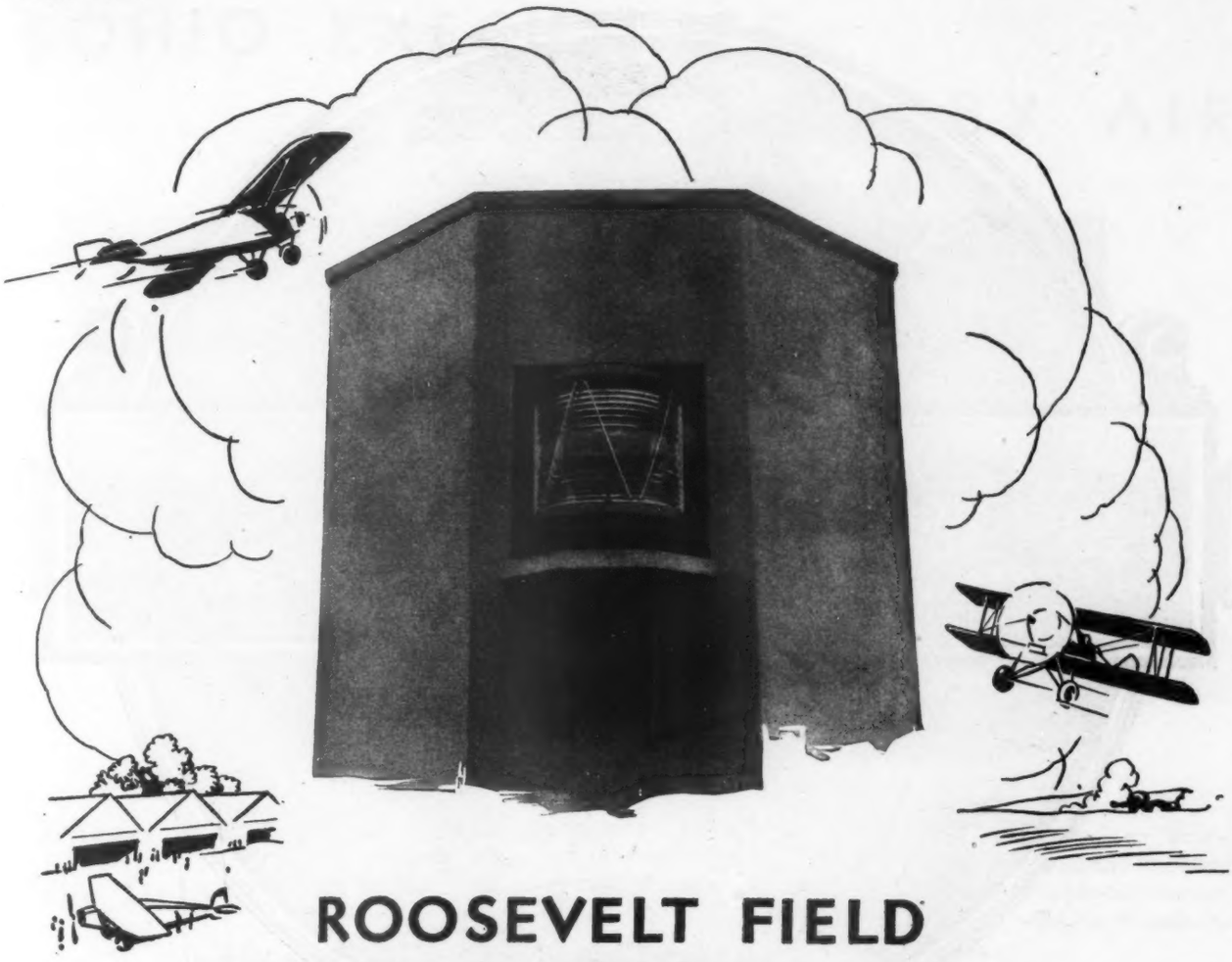
QUAKER STATE OIL REFINING COMPANY

Oil City, Pa.

. . . . . *Other Pure Pennsylvania Products Are* . . . . . .

QUAKER STATE MEDIUM MOTOR OIL
QUAKER STATE COLD TEST

QUAKER STATE HEAVY MOTOR OIL
QUAKER STATE TRACTOR OILS



ROOSEVELT FIELD CHOOSES SPERRY-A.G.A. FLOODLIGHT

Quick to realize its many important advantages, officials of Roosevelt Field have selected the SPERRY—A.G.A. Floodlight.

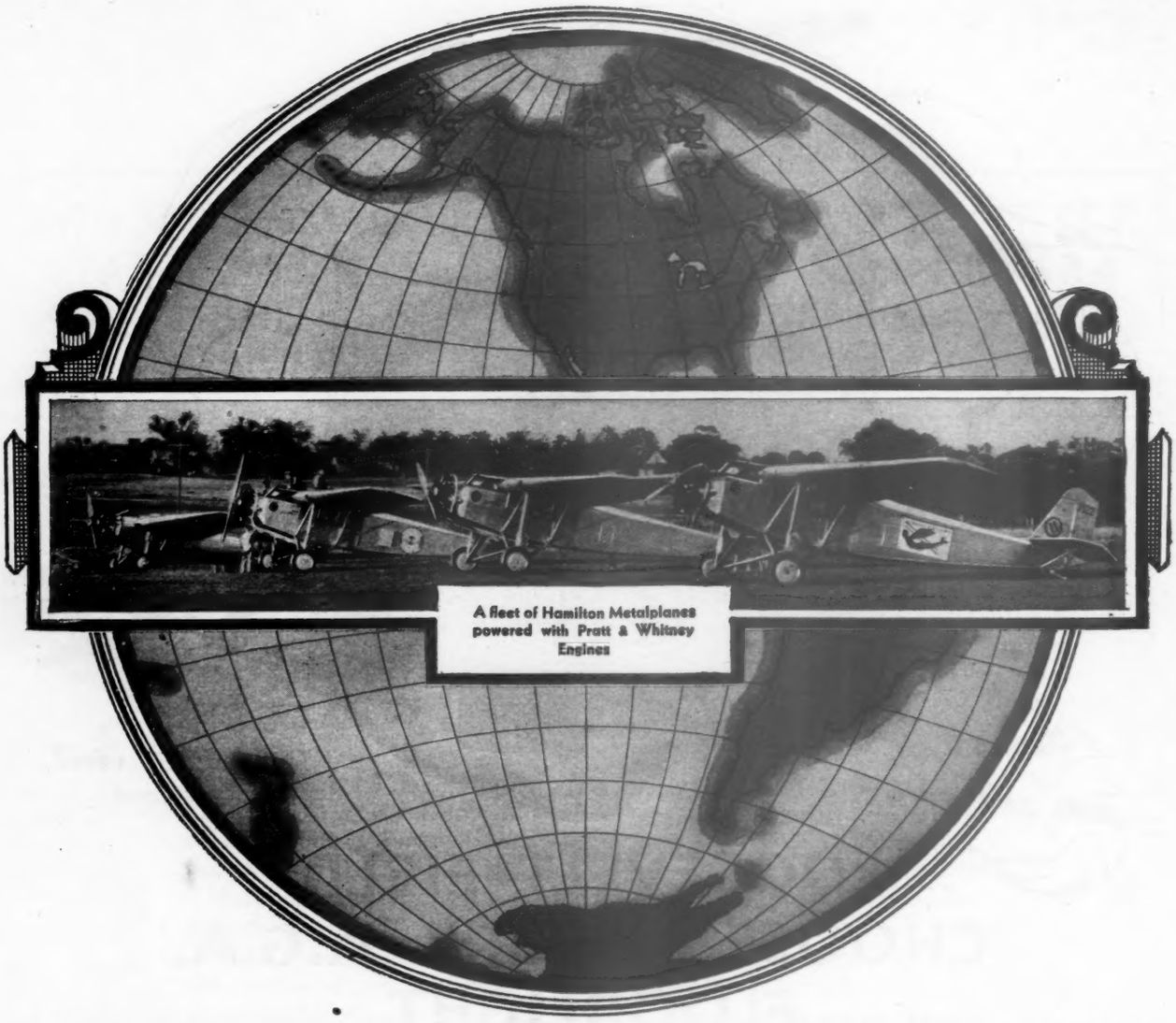
Airport officials and pilots who have observed and used this light are one in praising its great power; sharp cut off, preventing blinding; its smooth operation; and reliability with its fully automatic lamp mechanism, eliminating the need of constant attention while in operation.

Will gladly supply detailed information concerning this remarkable Floodlight upon request.

SPERRY GYROSCOPE CO., INC.

BROOKLYN
CLEVELAND PHILADELPHIA SEATTLE

NEW YORK
LOS ANGELES SAN FRANCISCO



A fleet of Hamilton Metalplanes powered with Pratt & Whitney Engines

EVERY HAMILTON METALPLANE

ever built IS STILL IN OPERATION

THE foregoing statement is entirely in line with the new standards of safety, durability and continued service that Aluminum and its alloys have brought to aircraft design.

Great fleets of Hamilton Metalplanes are in the air continuously—under every flying condition to be encountered between the Arctics and the Tropics.

Every one of them has met these conditions safely, satisfactorily, economically.

Hamilton designers have secured unusual strength, lightness and freedom from the corrosive action of the elements through the use of ALCLAD strong heat treated Aluminum alloys, surfaced with pure non-corrodible Aluminum.

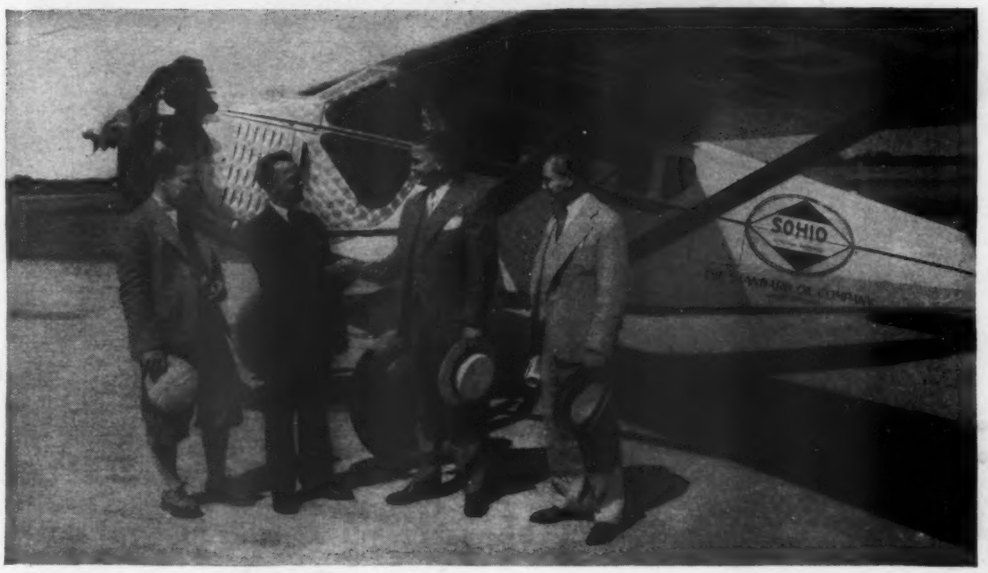
Aluminum Company of America, creator and producer of ALCLAD products, invites inquiry, correspondence and personal contact with its technical staff on any phase of the application of Aluminum to aircraft design.

ALCLAD
ALUMINUM

Aluminum Company of America
2482 Oliver Bldg., Pittsburgh, Pa.
Offices in 19 Principal American Cities

ALUMINUM AND ITS ALLOYS FOR AIRCRAFT

SOHIO EXECUTIVES TO TRAVEL BY AIR



Officers of Standard Oil Company of Ohio Take Delivery of New Ryan Brougham

Business has taken to wings. Executives of hundreds of organizations now use the skyways—for safe, reliable air transportation has introduced a new era of managerial efficiency.

Among the rapidly increasing number of organizations which are providing private planes for their officials is the Standard Oil Company of Ohio.

The picture above shows A. M. Maxwell, vice-president in charge of Sohio sales, taking delivery of the "Sohioan" —a new Ryan Brougham. At the right is Howard G. Jones, vice-president and treasurer of Sohio, and at the left is Dewey L. Noyes, the "Sohioan's" pilot.

Clifford Gildersleeve, president of U. S. Airlines of Cleveland and Ryan distributor for Ohio, is turning over the keys.

Choice by Sohio of the new Ryan Brougham for six, with its Wright 300 H. P. Whirlwind Nine, is another tribute to the well-earned leadership Ryan planes enjoy throughout the world.

Brilliant performance, inherent stability, together with stout and over-required ruggedness, are characteristic of the hundreds of Ryan ships in service both at home and abroad.

Those powered by the new Wright J6—with its additional hundred horse power—are achieving new performance and reliability records for their owners.

The new Ryan Brougham provides a cruising range of 700 miles—cruising speed of 120 miles per hour. It takes off fully loaded in 275 feet and in 8 seconds time—and it lands in a 200-foot circle. Ryan's performance and safety records are unexcelled by ships of its class.

Let us show you how the Ryan Brougham, or the Ryan Flying office will provide you, too, with new business advantages. Or write for our handsomely illustrated catalog containing complete information.

RYAN AIRCRAFT CORPORATION
Division of
DETROIT AIRCRAFT CORPORATION
Lambert-St. Louis Airport
ANGLUM, MISSOURI

SISTER SHIP OF THE "SPIRIT OF ST. LOUIS"

RYAN

Safeguarding the Night Sky Rider—

SAFETY—the watchword of commercial aviation—is not obtained in airport lighting by simply flooding the landing area with illumination of high intensity. Although sufficient light to reveal all surface details to the pilot must be spread over the runways, more important factors which enter into this class of illumination are:

1. Proper distribution of floodlights so that in landing the pilot never faces the source of light, regardless of the direction of wind.
2. Elimination of glare by keeping the light beam close to the ground and by cutting off the upward rays of light.
3. Utmost reliability, insured by the use of sufficient floodlighting units to make lighting failure at a critical moment practically impossible.
4. Simple and instantaneous operation to provide illumination at a moment's notice for emergency or unexpected landings.

These requisites of safe illumination are fully met by a Westinghouse airport lighting installation. And in many airports throughout the country Westinghouse lighting equipment is making night air transport safer.

Write for Special Publication 1854, Westinghouse Airport Lighting.

WESTINGHOUSE ELECTRIC & MFG. COMPANY
SOUTH BEND WORKS SOUTH BEND, INDIANA

SALES OFFICES AND SERVICE SHOPS IN ALL PRINCIPAL CITIES OF THE UNITED STATES

Westinghouse

T 30692

Serves the Aviation Industry with:

Chromilite Landing Field Floodlights
Wind Direction Indicator Lights
Hangar and Building Floodlights
Boundary, Approach, Obstruction Lights
Reflectors
Light and Power Plants
Underground Cable
Transformers
Motor-generators
Control Boards
Arc-welding Sets
Micarta Propellers
Micarta Pulleys
Micarta Fair Leads and Hinges
Micarta Plate for Cabins
Micarta Tail Skid Wheels

an IDEAL MATERIAL FOR HANGARS

..it is much more permanent than ordinary corrugated metal.....

..it costs much less than "heavy construction".....

RPM *hangars can be enlarged, moved, taken down or re-erected*

HERE is a material for hangars that is the happy medium between short-lived, unprotected metal roofing that rusts away before your very eyes . . . and the so-called "heavy construction" that costs far too much, and that cannot readily be changed, enlarged, or moved (and this last is a serious thing in a business that is changing and growing the way aviation is).

This ideal material that avoids the shortcomings of both the other kinds of construction is Robertson Protected Metal (RPM).

It is a solid steel sheet, corrugated for strength, and so skillfully protected with EXTERNAL coverings, that it is rust and corrosion-proof, and does not require painting or any other maintenance.

It is so economical in price that a hangar of RPM will often cost less than half of "heavy construction." Yet it will last for years and years and years without any attention.

It can be erected as easily and as quickly as the old unprotected metal. It can be taken down and moved across the air field, across the city, across the country . . . and erected again. For any additional information about RPM, write to

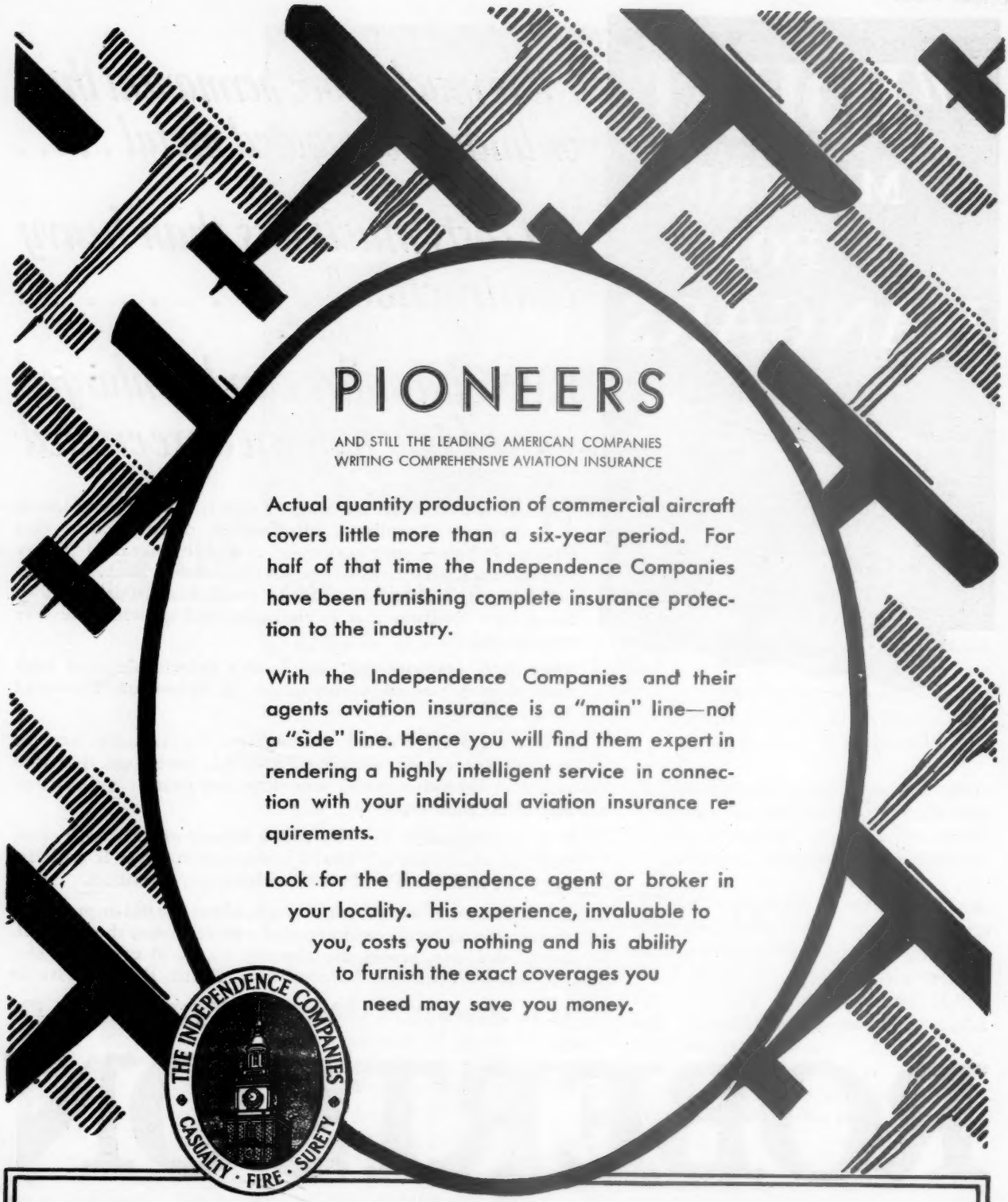
H. H. ROBERTSON COMPANY · PITTSBURGH, PA.

ROBERTSON

Has the Experience

WORLD WIDE
BUILDING SERVICE

A Hangar covered with RPM at the Municipal Flying Field, Chicago, Illinois



PIONEERS

AND STILL THE LEADING AMERICAN COMPANIES
WRITING COMPREHENSIVE AVIATION INSURANCE

Actual quantity production of commercial aircraft covers little more than a six-year period. For half of that time the Independence Companies have been furnishing complete insurance protection to the industry.

With the Independence Companies and their agents aviation insurance is a "main" line—not a "side" line. Hence you will find them expert in rendering a highly intelligent service in connection with your individual aviation insurance requirements.

Look for the Independence agent or broker in your locality. His experience, invaluable to you, costs you nothing and his ability to furnish the exact coverages you need may save you money.

THE INDEPENDENCE COMPANIES
CASUALTY · FIRE · SURETY

THE INDEPENDENCE COMPANIES

Independence Indemnity Company —— Independence Fire Insurance Company
Home Offices, Philadelphia —— Charles H. Holland, President

Casualty Insurance · Surety Bonds · Fire Insurance · Aviation Coverages

THESE COMPANIES MAINTAIN HUMAN RELATIONS WITH THEIR AGENTS, BROKERS AND POLICYHOLDERS

Gulfpride Oil .. AMERICA'S FINEST AVIATION OIL ....

The Oil Everlasting

This remarkable new aviation oil has been on the market but a few months, yet it has jumped into instant popularity with all those in aviation having to do with lubrication. It possesses the following necessary characteristics:

1—High resistance to oxidation

2—Low carbon and gum-forming qualities

3—Low pour tests

4—Minimum change of body under extremes of temperature.

It is approved by leading aircraft builders.

In justice to your motor—your company and your passengers — you should use GULFPRIDE.

Let us send you Free sample vial on request.

GULF

Gulf Refining Company

Pittsburgh, Pa.

An even greater reward *awaits* TODAY'S TRAIL BLAZERS!

Industry enjoys many important advantages in Los Angeles County.

...Year 'round equable climate.

...Largest concentrated market on the Pacific Coast.

...High per capita buying power.

...Splendid transportation facilities that provide economic access to all Pacific Coast markets and to export markets.

...Contented labor.

...Attractive living conditions for labor.

...Low building costs.

...Abundant low-cost power.

The "Covered Wagon" trail-blazer of '49 had no recourse to facts and figures. He came West...on faith.

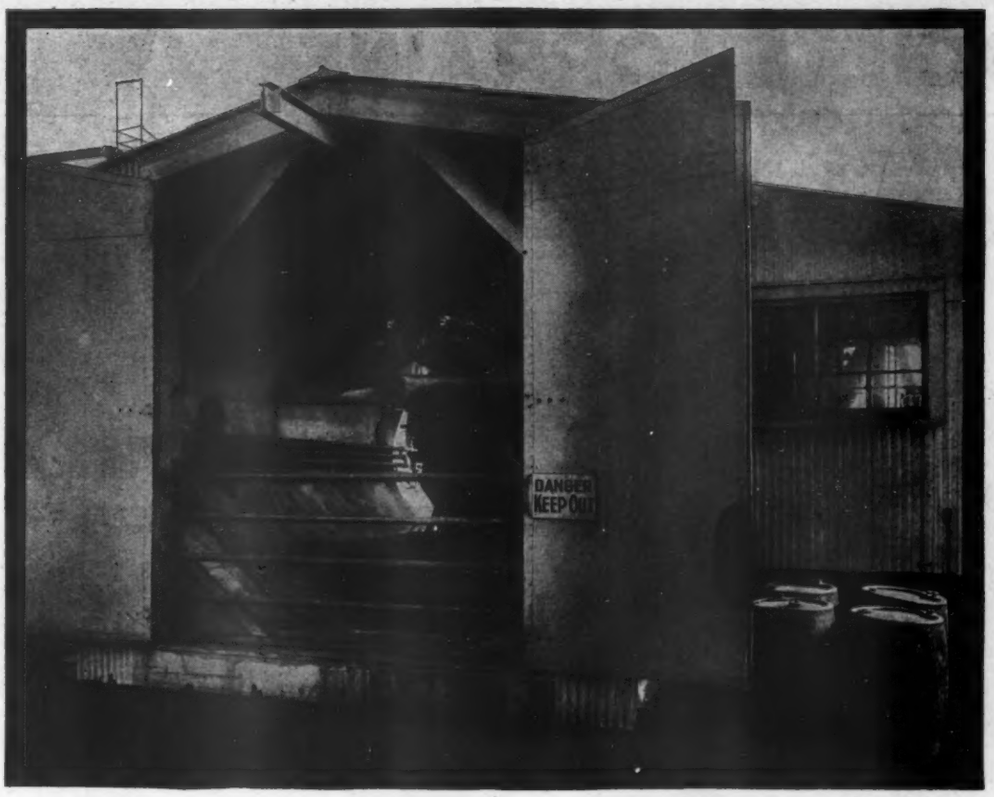
Today's trail-blazer...the air-minded manufacturer... has unlimited facts and figures to guide his decision. He is coming West...to Los Angeles County...not just on faith but because comparative facts and figures at his disposal show that Los Angeles County is more ideally suited for the aircraft industry than any other section of the United States.

...more hours of sunshine...less wind...less rain ...year 'round equable climate...more licensed pilots...more skilled mechanics...more aviation schools...more students in training...more identified and licensed airplanes in service...more airports...more aviation activity.

These are not just opinions. They are facts proven by statistical reports compiled by responsible and unbiased authorities...and available to you.

Air-Minded LOS ANGELES COUNTY

Complete detailed surveys and information supplied, upon request, by INDUSTRIAL DEPT., LOS ANGELES CHAMBER OF COMMERCE



Here's One Reason Why You Can Depend Upon *Stanolind Aviation Products*

HUNDREDS of tests of aviation gasolines and motor oils have been made in this shed. Here, under conditions approximating those encountered in the air, Stanolind Aviation Gasoline and Oils are tested constantly. Here new formulas are tried out in an effort to make possible improvements.

It is such constant testing combined with the most modern of refining methods that has made possible the superior quality of Stanolind Aviation Gasoline and Aero Oils. The purity and uniformity of these products have been proved over long periods of air mail and commercial flying and in the exacting requirements of air races and endurance contests. With thousands of flying hours to their credit never have Stanolind Aviation Gasoline and Aero Oils been guilty of causing engine failure through faulty combustion or improper lubrication.

Ask for Stanolind Aviation Products at your flying field.

Beginning Sunday, October 20th, and continuing thereafter every Sunday afternoon between 2:00 and 3:00 P. M., central standard time, the Standard Oil Company (Indiana) will broadcast the incomparable music of the Chicago Symphony Orchestra over the following stations:

WGN	Chicago
WWJ	Detroit
WTMJ	Milwaukee
KSD	St. Louis
WOC	Davenport
WHO	Des Moines
WEBC	Superior
KSTP	St. Paul-Minneapolis
WDAF	Kansas City
WOW	Omaha

STANDARD OIL COMPANY (*Indiana*)

General Offices: 910 South Michigan Avenue CHICAGO, ILLINOIS

Chicago	Detroit	Grand Rapids	Joliet	Mason City	Peoria	South Bend
Davenport	Duluth	Green Bay	Kansas City	Milwaukee	Quincy	St. Louis
Decatur	Evansville	Huron	La Crosse	Minneapolis	Saginaw	St. Joseph
Des Moines	Fargo	Indianapolis	Mankato	Minot	Sioux City	Wichita

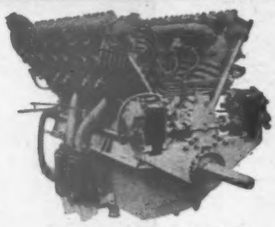
322

SOCIÉTÉ LORRAINE

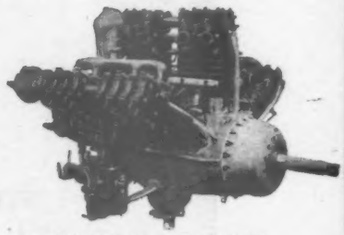
200 ROUTE DE BEZONS
A ARGENTEUIL. (S.&O.)

TÉLÉPHONE
WAGRAM: 99.87

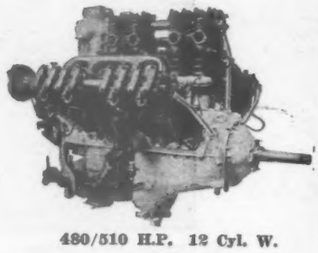
REG. COMMERCE
SEINE. Nº 111·677



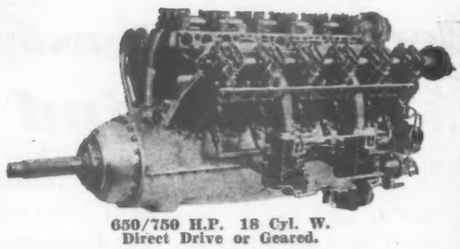
400/410 H.P. 12 Cyl. V.



450/500 H.P. 12 Cyl. W.
Direct Drive or Geared.



480/510 H.P. 12 Cyl. W.



650/750 H.P. 18 Cyl. W.
Direct Drive or Geared.

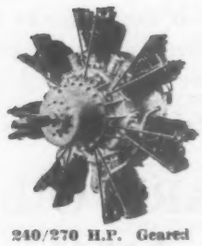
MOTEURS D'AVIATION

LORRAINE

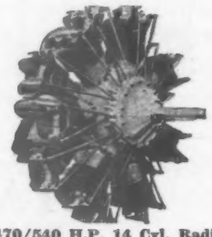
600/700 H.P. 12 Cyl. W.
Direct Drive or Geared.

100/120 H.P. 5 Cyl. Radial

240/270 H.P. 7 Cyl. Radial



240/270 H.P. Geared



470/540 H.P. 14 Cyl. Radial
Direct Drive or Geared.

Marine Motors of 250 and 500 H.P.

Automobiles 15 H.P. Sport and Touring Models

PASSENGERS ARE WAITING—

for a transport like this!

Boeing Model 80-A . . . .
Engineered and manufactured by Boeing to provide air-comfort as well as safety and performance.

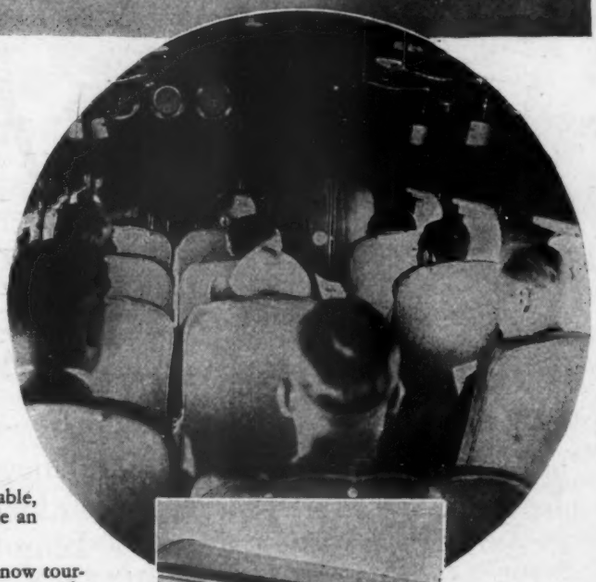
THIS new tri-motored biplane incorporates features developed by millions of miles flown in Boeing planes. It is America's largest airplane factory's answer to the demand for an outstanding passenger transport—one which will not only return dividends to its owners in performance and economy, but which possesses refinements purchasers rightfully expect in this day of rapid progress in aeronautical design.

Boeing Air Transport Inc., has purchased a fleet of these planes for operation on the longest air-line in the world (San Francisco to Chicago). No other route in the U. S. includes such varied conditions of climate and altitude. Planes must fly from sea level to 12,000 feet. They will encounter ground temperatures ranging from 20 below zero to 135 Fahrenheit.

Such a route requires a plane engineered along sturdy lines, to be air-worthy under every condition which can be encountered in operations anywhere in the United States. Yet it must be swift, maneuverable, economical to operate and comfortable to ride in—in order to provide an attractive service to the traveling public (and a profit to its owners).

The first Model 80-A* (displayed at the Cleveland Air Show) is now touring the east and middle west. To appreciate its superiority you should see it, ride in it or ask for a demonstration. Detailed information will be sent upon request.

*NOTE: Model 80-A will also interest concerns who recognize the advantages and prestige of having their own air travel facilities.



Entering this plane is like stepping into your own automobile.

Once inside the insulated and sound proofed cabin you relax in upholstered reclining, adjustable chairs.

The cabin is 19 feet long 6¾ feet high 5¾ feet wide. Roomy. Has many very distinctive features.

S P E C I F I C A T I O N S

Approved Type, Certificate No. 206. Engines: Three Pratt & Whitney 525 H. P. "Hornets"

Performance (with full load—estimated)

High Speed	138 M. P. H.	Climb in 10 Minutes	7,000 Ft.	Take-off Time	11 Seconds
Landing Speed	55 M. P. H.	Service Ceiling	15,500 Ft.	Wing Loading	14 Lbs. /Sq. Ft.
Rate of Climb	900 F. P. M.	Take-off Run	750 Ft.	Power Loading	11.6 Lbs. /H. P.

Dimensions

Length overall	55'	Wing Span—upper	80'
Height overall	15' 2"	Wing Span—lower	64' 10"

Weights

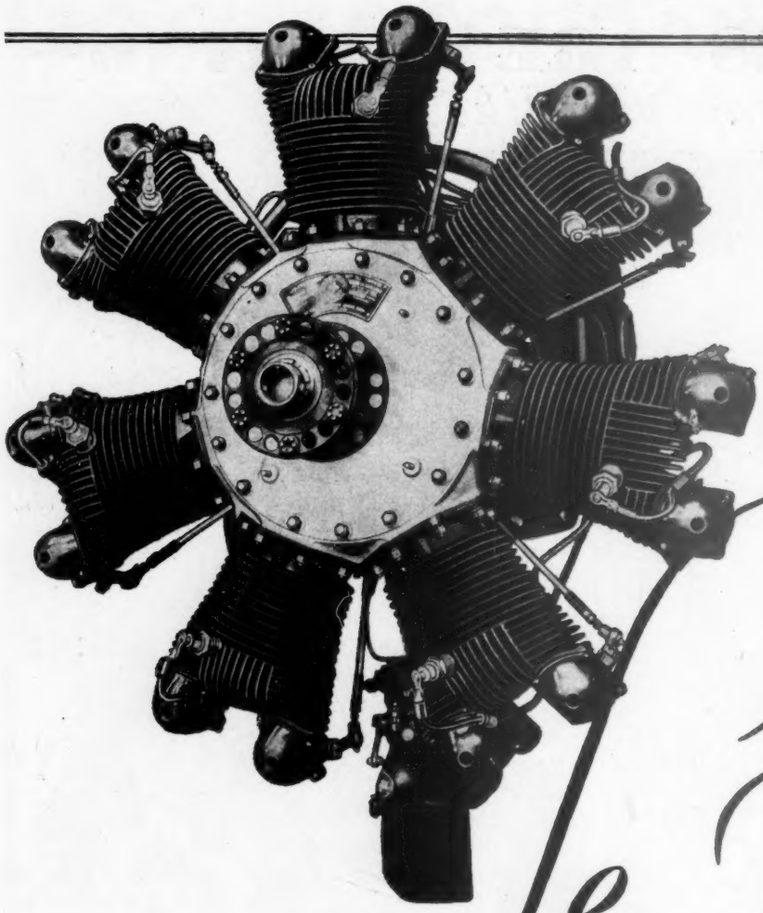
Weight Empty	10,413 Lbs.	Oil (35.5 gallons)	266 Lbs.
Useful Load (18 passengers)	7,087 Lbs.	Actual Pay Load (18 passengers)	4,081 Lbs.
Pilot and Mechanic	340 Lbs.	Gross Weight Loaded	17,500 Lbs.
Fuel (400 gallons)	2,400 Lbs.		

SPECIAL FEATURES—Comfortably upholstered passenger seats. . . Cabin and cockpit heating and ventilation systems. . . Hot and cold running water. . . Toilet facilities. . . . Metal racks for hats and small parcels. . . Fully-lighted cabin. . . Treadle type oleo landing gear. . . Foot-operated mechanical brakes. . . Retractable landing lights. . . Electric Inertia Starters on all motors . . Bonded and shielded throughout for radio installation.

BOEING AIRPLANE CO.

. . . *Division of United Aircraft & Transport Corporation* . . .

SEATTLE, WASHINGTON



Le Blond

WHEN a company which, itself, enjoys as enviable a reputation for precision as does Le Blond comes to Ex-Cell-O for those aircraft engine parts where accuracy is of first importance, there must be a good reason for it.

The Ex-Cell-O plant is equipped both as to machinery and personnel for the complete production of engine parts of more than ordinary accuracy and serves the country's foremost aircraft engine builders. Ex-Cell-O parts are made exclusively to manufacturers' specifications.

1226 Oakman Boulevard, Detroit, Michigan

EX-CELL-O
Aircraft XLO *& Tool*
Corporation

ST. LOUIS

"THE *Natural* CENTER *of* AVIATION"

ST. LOUIS

"STRATEGIC LOCATION"

ST. LOUIS

"—*the* SHIPS *and the* ENGINES *and the* MEN *to run them, too*"

ST. LOUIS

"CROSSROADS OF THE AIR"

AVIATION

is headed towards ST. LOUIS

Mr. Manufacturer!

—why don't you, too, take advantage of St. Louis' superior location?

Surely you must have noticed the unusual development of Aviation's progress in the St. Louis district. You have seen, here many of Aviation's outstanding accomplishments; its new achievements; the concentration of great organizations... But has the possible personal application ever occurred to you?

Picture your own factory—your business—in this big air-minded city! Here, in the friendly, keenly interested atmosphere which sponsored Lindbergh's Flight! Surrounded by other manufacturers in your own and allied lines! Served by the endless advantages of a major manufacturing city! Spotted at the natural Center of Aviation—the Crossroads of the Air!

Spread around you here are thousands of miles of level flying country. Nearby are fifty million people. Aloft are air conditions that make possible World's Endurance Records; that, more practically, make Aviation a sure and certain phase of Transportation. Here is finance unlimited; here are materials, men, power, railroads, markets; here are ideal manufacturing conditions.

Why not, in these early days of this unfolding industry, establish yourself where advantages of location apply invaluable leverage for your permanent success? Why not let St. Louis tell you its vital story through the mouths of other business men like you—men who came, and saw, and profited.

Let us acquaint you with them, confidentially and without obligation!

INDUSTRIAL BUREAU OF THE INDUSTRIAL CLUB OF ST. LOUIS

Dept. A-2 . . . 511 Locust Street . . . St. Louis, Mo.

What NATION-WIDE CURTISS SERVICE *means to Dealers*

Why 40 Branches at Strategic Points are proving indispensable

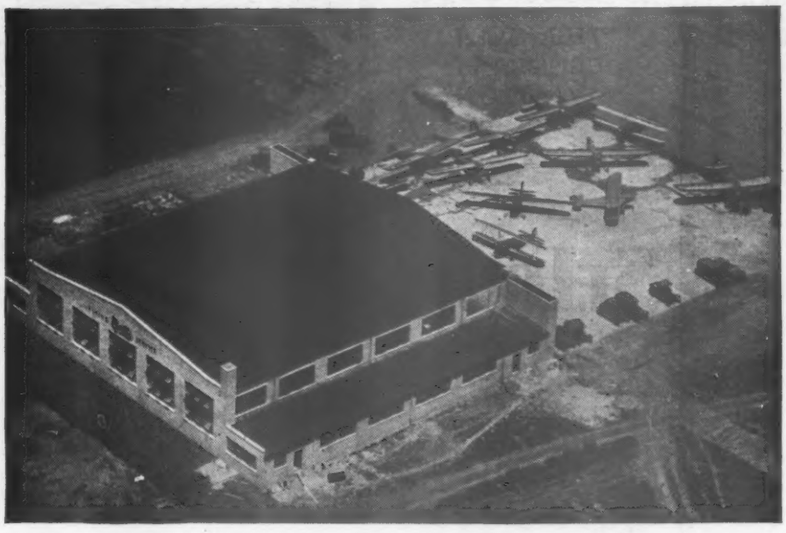
THERE are 40 Curtiss Branches strategically located throughout the country today. One—or more—within easy flying distance of your field . . .

Consider what that means to you and to your customers.

It means you—and through you, your customers—can get instant aviation service of any kind.

Recently, a Robin was damaged in landing at Syracuse. Undercarriage, one wing and propeller broken. The owner *had* to be in New York early the next morning . . . a valuable business contract depended on it. And the Robin factory was 800 miles away!

His ship was wheeled into the hangar. Curtiss Flying Service—Syracuse Branch—supplied all necessary parts from their complete stock. Expert Curtiss mechanics worked on the repairs. By midnight, the Robin was again on the line . . . ready to start . . . as good as new. At dawn . . . off for New York — and the business contract.



One of Curtiss' 40 Airport Stations where a full line of planes, parts and accessories is carried . . . And expert servicing is always available.

That's an example of the service the Curtiss chain of branches offers.

Such service puts your business on a sound basis. It reduces your investment in spare parts and storage space. It holds your overhead to a minimum.

It makes you a part of the nation's leading air organization . . . Curtiss Flying Service . . . with all the facilities and resources of that organization at your hand.

And remember. Curtiss carries a full line of planes, engines and equipment. Their quality—you know. Their price range is as wide and complete as the products.

Introduce yourself to the manager of the nearest Curtiss Branch today. Let him explain in more detail why the Curtiss franchise is the best in the business. Or write for complete, immediate information. Curtiss Flying Service, Dept. 25, 27 West 57th Street, New York City.

CURTISS FLYING SERVICE

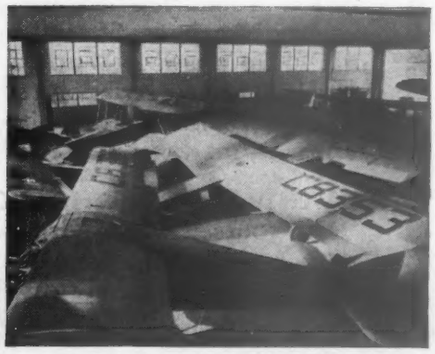
Sales agent for:

Curtiss-Robertson Airplane Mfg. Co.; Cessna Aircraft Co.; Curtiss Aeroplane and Motor Co., Inc.; Ireland Aircraft, Inc.; Command-Aire, Inc.; Moth Aircraft Corp.; Aircraft Service and Accessories; Airport Lighting Equipment.

Operations:

Aerial Transportation, Aerial Photographic Surveys, Agricultural Dusting, Flying Schools.

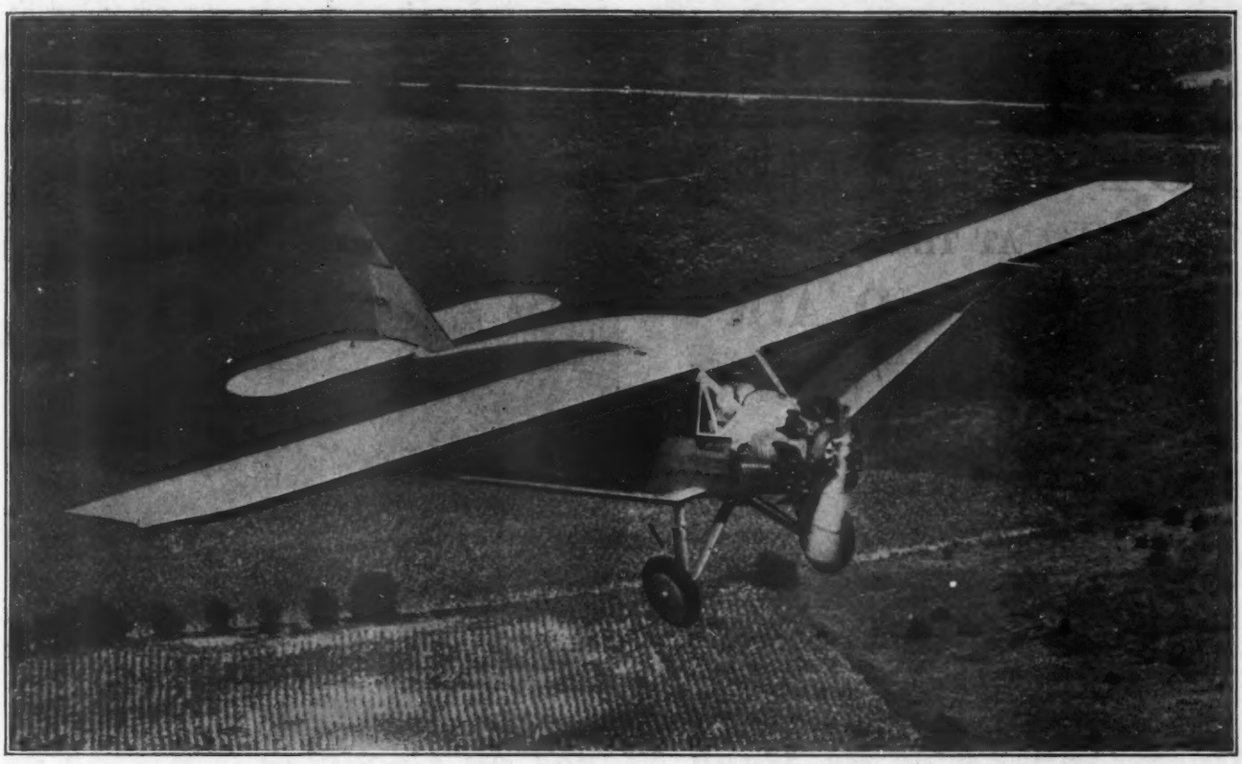
Experienced Curtiss mechanics are trained to know thoroughly all planes and engines of the Curtiss line.



Modern Curtiss hangars everywhere are especially designed to allow full storage and accommodation facilities.

CURTISS FLYING SERVICE

"World's Oldest Flying Organization"



The new 1930 Bellanca Pacemaker. Payload (with pilot), 1,235 lbs. High speed, 145 m.p.h. Cruising speed, 122 m.p.h. Brochure with specification on request.

A clean-up at Cleveland

NO COMMERCIAL plane has ever made such a complete demonstration of superiority as the Bellanca at the Cleveland National Air Races. Out of 7 events entered, the Bellanca stock models took 5 First Prizes, 2 Second, 3 Third, and 2 Fourth. It is a remarkable tribute to Bellanca that, where measured on combined speed, carrying capacity and take-off, almost the same design has won so repeatedly—originally and essentially a Bellanca design.

For the fifth time a Bellanca six-place cabin monoplane captured the Aviation Town and Country Club Trophy; for the third time, the Detroit News Trophy for Speed and Efficiency. In the latter contest, planes were required to take off with full Department of Commerce loaded weight within 900 ft., which both Bellancas did easily, though three other cabin planes, some of equal, some of greater h.p. and some carrying less load than the Bellanca, failed at Cleveland to take off in this distance.

Here are the official awards:

Philadelphia-Cleveland Derby

(Heavy Class)

First Place	**J. Wesley Smith**	**Bellanca 300 h.p.**

(Light Class)

Third Place	**Howard P. Young**	**Bellanca 220 h.p.**

Cleveland-Buffalo Efficiency Contest

First Place	**George W. Haldeman**	**Bellanca 300 h.p.**
Second Place	**J. Wesley Smith**	**Bellanca 300 h.p.**
Fourth Place	**Howard P. Young**	**Bellanca 220 h.p.**

Detroit News Trophy for Speed and Efficiency

(Third time won by a Bellanca stock model)

For Speed

First Place	**George W. Haldeman**	**ellanca 300 h.p.**
Second Place	**J. Wesley Smith**	**Bellanca 220 h.p.**

For Efficiency:

First Place	**George W. Haldeman**	**Bellanca 300 h.p.**
Third Place	**J. Wesley Smith**	**Bellanca 220 h.p.**

Event No. 19—Cabin Place Speed Race

(Competing against 425 hp. speed planes with N.A.C.A. cowling)

Third Place	**J. Wesley Smith**	**Bellanca 300 h.p.**
Fourth Place	**Howard P. Young**	**Bellanca 300 h.p.**

Aviation Town and Country Club Trophy

(Fifth time won by a Bellanca)

For Efficiency

First Place	**J. Wesley Smith**	**Bellanca 220 h.p.**

The sales actually closed at Cleveland were the best possible confirmation of these triumphant results. For Bellanca, Cleveland definitely spelled a new step of progress that will be shared by every Bellanca sales representative. Bellanca Aircraft Corporation, New Castle, Delaware.

BELLANCA

88 out of 161 PLANES AT THE CLEVELAND AIR SHOW wore Goodrich SPLIT-SECOND Silvertowns

More than Twice as Many Planes on Goodrich Tires as on Any Other Make!

(UPPER RIGHT) *Goodrich Test Plane No. 2 is equipped with Split-Second Silvertown Non-Skid Tires and Goodrich Streamline Shields.*
(LOWER LEFT) *Goodrich's pilot Schoenhair won the $2,500 prize at Cleveland Air Races, flying one of the three planes used by Goodrich to test its rubber products for aviation* in the air.

YOU ask, "*Why* such an overwhelming majority of Goodrich Airplane Tires?" You say, "There must be something unusual about this tire . . ." There is. Goodrich made airplane tires when Aviation wore pin feathers. For years Goodrich has devoted its entire engineering research along aeronautical lines to rubber equipment for *heavier-than-air craft.*

Goodrich Split-Second Airplane Tires are made of strong, stretch-matched cord and rubber that *is toughened right on down to the innermost ply* by the famous Goodrich "water-cure process."

They have been tested for *strength,* for *weight,* for *speed* by such world-famous pilots as Lindbergh, Chamberlin, Brock and Schlee, Goebel, Kingsford-Smith, Hawkes and Schoenhair in world-famous, record-breaking flights . . . tests so severe that the pilots broke world records!

No wonder *pilots* prefer them. No wonder more engineers specify them as *standard equipment* on all types of military and commercial planes. *No wonder the public feels safer when pilots fly planes equipped with them!*

Of course, Silvertowns were first at Cleveland as at every other major aircraft show!

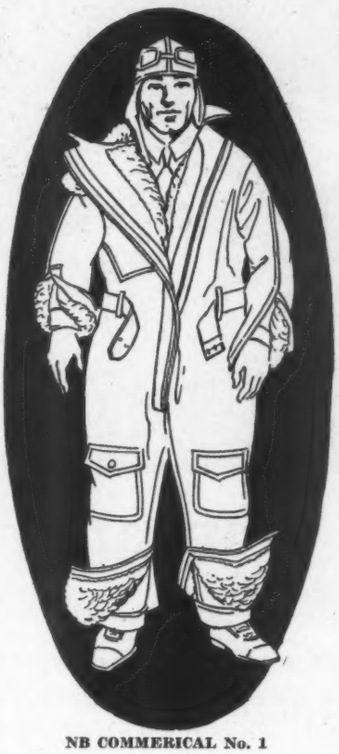
The B. F. Goodrich Rubber Co., Est. 1870, Akron, Ohio. Pacific Goodrich Rubber Co., Los Angeles, Calif. In Canada: Canadian Goodrich Co., Kitchener, Ont.

Goodrich

Rubber for Aviation

Get Ready for Cold Flying Weather

Complete aeronautical stocks at your command. In our position of the world's largest aeronautical supply house, our stock is kept up to the minute at all times. We can fill any aviation need—and "Ship the Same Day."



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NB COMMERCIAL No. 1—Finely woven buckskin cloth, semi water proof, olive drab color. Lined throughout with heavy fur. Wide collar lined with Bulgarian Lamb fur. Zipper fasteners. Large pockets are built in the suit. Double stitched seams and quilt stitched throughout.....$75.00

NB COMMERCIAL No. 2—Same as above except lined with best grade long wool sheepskin.
No. 1 grade.....$60.00
No. 2 grade.....50.00

ARMY-NAVY No. 1—Outer covering made entirely of heavy grade Jungle Cloth, lined throughout with best grade South American Electrified Lambskin, collar lined with South American Beaver (Nutria). The best flying suit made in America, regardless of price. Each.....$140.00

ARMY-NAVY No. 2—Same as above, except lined with heavy sheepskin wool.....$120.00

Flying Suits supplied in all sizes—36 to 48.

ARMY-NAVY No. 1

AVIATOR'S BREECHES

No. 131MET—Imitation Bedford Cord. Chamois leather re-inforced. Button bottoms on legs. Pair $7.50
No. 600MET—Genuine Bedford Cord. Chamois leather re-inforced. Button bottoms on legs. Extra high quality. Pair, $17.50
No. 605MET—Imported Cavalry Twill. A super-quality dress material that will almost wear forever. Chamois leather re-inforced. Pair, $20.00

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SCULLY No. 91—Imported Cordovan cape. Grey suede, leather lined, medium weight. $6.50
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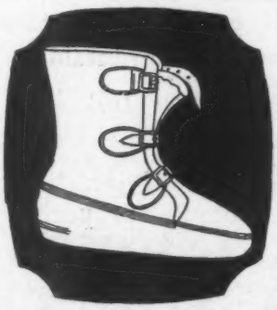
SCULLY No. 92—Imported Cordovan cape, grey suede, leather lined, with wool inner lining for winter use $7.50
SCULLY No. 94—Imported Cordovan cape, beaverized lambs wool lining. Special wind-tite features for winter flying.....$10.00
ARMY No. 1—Chocolate leather, sheepskin wool lined, extra heavy weight. $5.00
ARMY No. 2—Soft lined tanned leather, soft fur lining, heavy winter weight. $6.50
ARMY No. 4—Chocolate leather, chamois skin lined, medium weight.....$4.00
NAVY No. 4—Imported chocolate cape, chamois lined, powder puff ear pads. $6.00
NAVY No. 2—Chocolate leather, lined with beaverized wool, extra heavy weight. $6.00
NB COM. No. 1—Soft light colored leather, fur lined, extra heavy weight.....$4.00
NB COM. No. 2—Soft dark or light colored leather, heavy sheep wool lining, extra heavy weight $4.00

GLOVES—MITTENS

JX278—Full short mitten, genuine black horsehide, lamb lined. Pair $4.00
JX285 — One - Finger Mitten Flexicuff. Pair. $5.00
JX286—Full Mitten, Flexicuff. Pair. $5.25
JX288—Glove, complete Lamb lined. Pair $5.50
IX275—Short Glove, unlined black horsehide 3.00

MOCCASINS



NB No. 1—Genuine leather, sheep wool lined three buckles. Pair $15.00
NB No. 2—Same as above, except slightly used. Pair $6.00
WAR SURPLUS MOCCASINS — Heavy, sheep lined. Snap up front. Pair. $2.50
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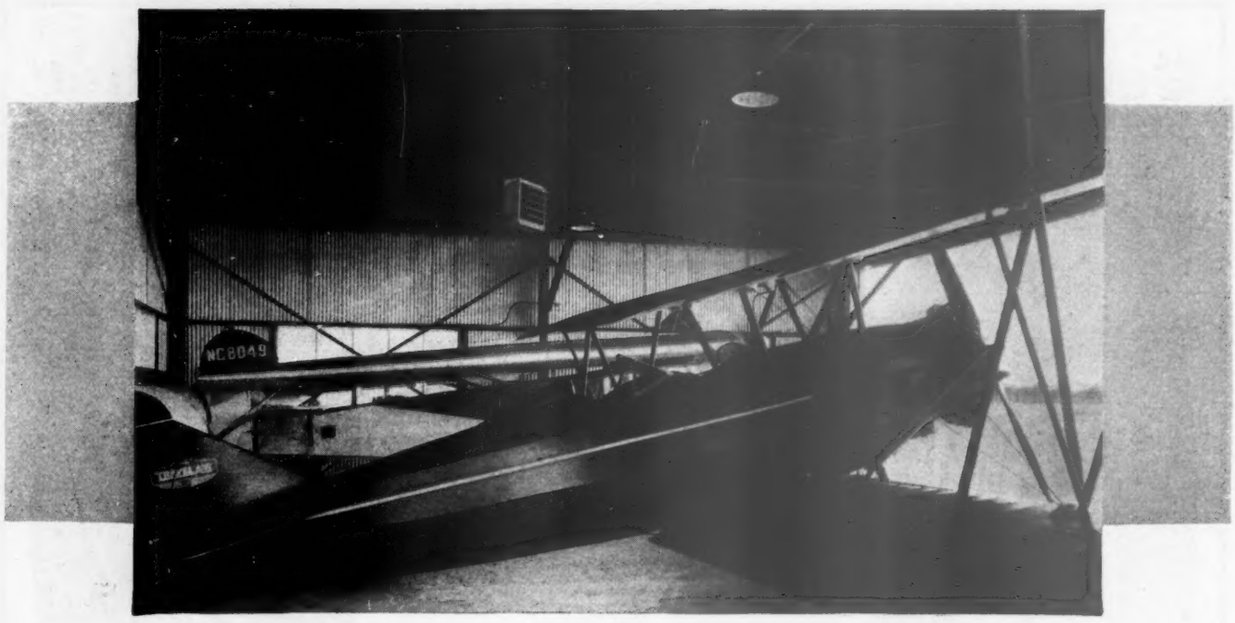
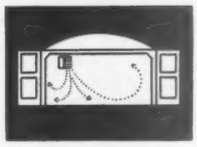
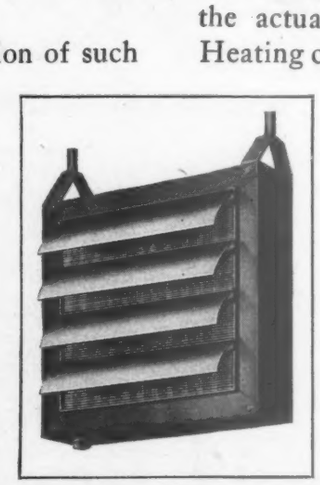


The Best Way to Heat a Hangar



To maintain comfortable working temperatures in hangars, with the doors periodically thrown wide open, requires a highly flexible heating system which can deliver a large amount of heat almost instantaneously. The method of heating best suited to meet these conditions is a proper installation of unit heaters.

Continued satisfactory operation of such a heating system requires careful selection of units as well as the correct method of installation. Trane Unit Heating is an engineered job, from the patented Trane heating element to the final checking of a Trane Unit Heater installation. The units are installed to deliver a downward flow of heated air against the hangar doors so that when they are open the inrush of cold, outside air is minimized.



Trane Unit Heaters are extremely rugged yet very light in weight for a given heating capacity. They can be mounted from brackets attached to the walls or the roof trusses—up out of the way. Aside from the actual saving of fuel, Trane Unit Heating costs 30 to 40% less than cast iron or pipe coil radiation. You can augment your present heating system with Trane Unit Heaters, or better still, you will find a complete change-over most profitable.

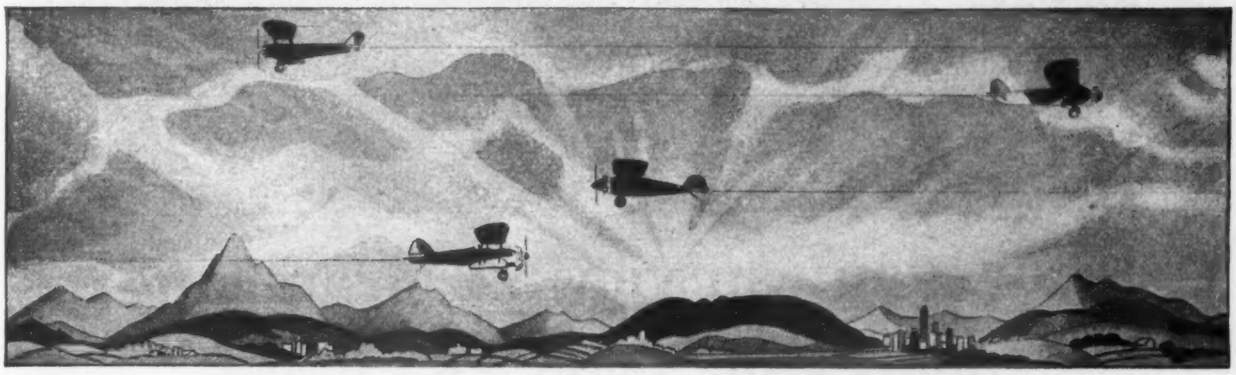
You can obtain full information on Trane Unit Heating by returning the coupon below, properly filled in.

TRANE
UNIT HEATING SPECIALISTS

THE TRANE CO., Dept. 10, 248 Cameron Ave., La Crosse, Wis.
Send complete information on Trane Unit Heating Systems.

Name.....Position.....
Company.....
Address.....Size of Hangar.....
City.....State.....

LEVEL FLIGHT AT ACCURATELY KNOWN ALTITUDES ASSURED



Now traffic in the air can be regulated! Danger of collisions greatly reduced! The pilot can now set his safe altitude of flight on the dials of the Paulin Level Flight and Altitude Indicator... to clear all known obstructions... to take advantage of the best air conditions... then keep his ship constantly on a level course at any altitude desired. Should he gain or lose altitude... even a few feet above or below the set course... his Paulin Instrument will warn him immediately. This amazing new instrument... luminous at night... is not only an *exact* altimeter and a checking barometer, but also a guide that insures absolutely level flying, eliminating all guesswork.

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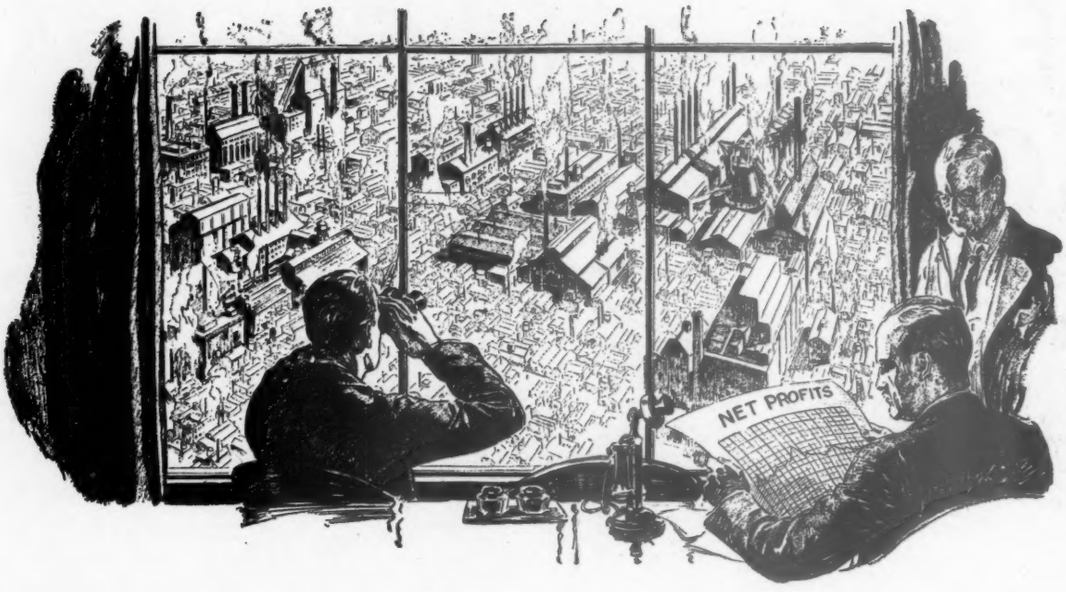

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MANUFACTURERS seeking new locations need a clearing house for data. They want preliminary and unprejudiced information regarding vacant plants and unimproved industrial property. They want to get it without obligating themselves or exposing themselves to go-getter salesmen.

Such a service is made available with the establishing of the Industrial Site Service Bureau—a cost-free, confidential service of nation-wide scope.

The Bureau is equipped to supply pertinent plant location information on the various localities and sections of the country. This information means more than names of places, size and population. It includes available raw materials and markets, power and transportation facilities, labor conditions and local legislation. A classified listing of available industrial properties is also maintained as a part of the service to industry.

Readers of McGraw-Hill publications are already drafting the help of the Bureau in their preliminary studies of plant expansion, branch operations and relocation. Can you use this service? Maybe your profit margin can be broadened by the natural and economic advantages of other localities, by closer proximity to new markets. Maybe not. But such possibilities should not be overlooked.

Direct your correspondence to the Industrial Site Service Bureau, McGraw-Hill Publishing Company, Tenth Avenue at 36th Street, New York.

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C & L 32

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Do you get a real kick when you pick up a good tool? One that makes working a pleasure? That makes you want to stick at the job? Well, be set to feel that way when you take up a Clayton & Lambert blow-torch.

In a Clayton & Lambert you buy all the exactness and pride that can be put into a blow-torch. You get materials that have proved their value by use. You obtain the result of 40 years' experiment and invention —exclusive Clayton & Lambert improvements. In construction and mechanism, Clayton & Lamberts are made with an eye for long, efficient service.

For instance—the vaporizing chamber has an exclusive vein system for quicker, hotter heat. That makes the torch function better and saves money on your fuel bills. All fittings are built into the tank by a patented method that prevents their falling in or coming out. There's ABSOULTELY NO DANGER of an explosion with a Clayton & Lambert torch. Even the most delicate part—the gas orifice—is fool-proof. In the No. 158 the orifice has a guard. The slightly higher priced No. 32 has a patented design, so that you'll never ruin the torch by a careless twist of your wrist.

The next time you're in a hardware or electrical store look for a torch with a gold-banded, red handle. Be sure of the handle—it marks a Clayton & Lambert. Then you're getting the largest selling torch in the world.

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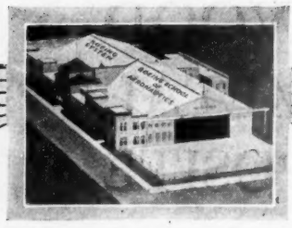

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DON'T just *"learn to fly."* The bigger jobs will go to men who *know aeronautics;* those schooled first in important ground work, then coached carefully by experts in those important fundamentals that govern safe air transportation.

Courses *now given* at Boeing's new Oakland California School of Aeronautics are based on practical knowledge and experience. Facts flown out of the seven million miles that Boeing pilots have flown Boeing planes, form the basis of courses far more comprehensive than ever offered before—taught by men who are admittedly leaders in their particular fields of aeronautics.

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Past Pres. Pilots' Association. Air Mail Pilot since 1923, with 5000 hrs. of flying experience, of which 1500 was at night.

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*NOTE: The Boeing School is identified with the United Aircraft and Transport Corporation, a merger of numerous aeronautical manufacturing and operating companies.

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ABSOLUTE safety and dependability are of such paramount importance in modern aircraft, that they constitute the unwritten law by which everything in aviation is judged.

To meet the special need for aircraft, Champion introduced a few months ago, the revolutionary new Aero A spark plug for all aircraft engines.

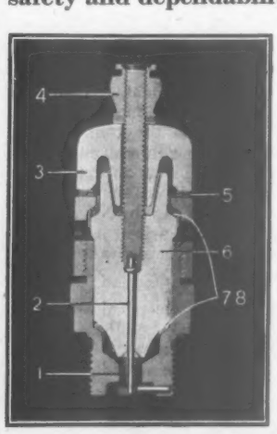
Developed after three years of the most exhaustive tests and experiments, the Aero A incorporates principles which bring to all engines a new factor of safety and dependability.

Performance unequalled, plus the new conception of dependability exclusive to Champion Aero A have won instant acclaim and a rapidly accelerating demand from transport lines, mail lines, and private owners alike.

Retaining all the exclusive and time-tested superiorities of all Champion Spark Plugs, the Aero A represents the first great advance in basic spark plug design to meet the specific needs of aircraft engines.

The Champion Aero A cannot be broken in such a way as to interfere with engine operation. The carefully proportioned restricted bore permits the adaption of this plug to practically all modern radial air cooled, and high compression water cooled engines. The exclusive sillimanite insulators will withstand a maximum amount of oil without fouling, and the heat range is such that pre-ignition is unheard of. Special analysis electrodes resist pitting and burning to the utmost, while molded copper gasket seals are permanently gas-tight.

Install a complete set of Champion Aero A spark plugs in your ship for maximum performance, safety and dependability.



Champion Aero A Exclusive Features

1. Restricted bore. 2. Special analysis electrode. 3. Secondary sillimanite dome insulator. 4. Welded steel terminal. 5. Copper seal. 6. Primary sillimanite insulator. 7-8. Molded copper gasket seals.

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Concentration on this one type spark plug (Aero A) for all aircraft engines enables Champion by virtue of large production, to offer this vastly superior spark plug at the extremely low price of $1.25.

CHAMPION
SPARK PLUGS

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WEIGHS ONLY 2¾ LBS.

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The drills are made in two sizes—3-16 and ¼ inch and in two speeds so as to meet the conditions on various kinds of work. The weight is only 2¾ lbs. Length overall is 9¼ inches.

The distance from the side of the case to the center of spindle is only ¾ inch allowing use in close corners.

You can try one of these small drills in your own shop, under your own conditions, for ten days, free of charge. Put it to the test. If its performance doesn't satisfy you, return the tool at our expense. No obligation —no red tape. Simply write us.

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PNEUMATIC TOOLS — 250 S. Jefferson St., Chicago, Ill. — ELECTRIC TOOLS

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That's your signal that cold, biting weather is coming to the high altitudes. Your cue to think about warm and comfortable togs for the long stretch of winter flying just ahead.

Already hundreds of pilots whose first thought is of comfort and quality in the clothing that protects them, high in cold winter skies, are securing their togs—togs that bear this famous name—

Snappy Snug
Flying Clothes

These flying clothes and helmets are of the finest quality and workmanship. They are made to fit snugly and wear a long life of complete satisfaction.

The quality and cut of Snappy Snug Flying Clothes have won them a first preference on many of the renowned distance and altitude flights, and army and navy pilots use more of them than any other brand.

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CANVAS LEATHER SPECIALTY CO.
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VI. Insolation.
VII. Atmospheric Circulation: General Principles.
VIII. Atmospheric Circulation: General Principles (Continued)
IX. Atmospheric Circulation (Continued).
X. Atmospheric Circulation (Continued).
XI. Atmospheric Circulation (Continued).
XII. Atmospheric Circulation (Continued).
XIII. Atmospheric Circulation (Continued).
XIV. Barometric Fluctuations.
XV. Evaporation.
XVI. Fogs and Clouds.
XVII. The Thunderstorm.
XVIII. Lightning.

Part II. Atmospheric Electricity and Auroras

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II. Aurora Polaris.

Part III. Meteorological Acoustics.

I. Meteorological Effects on Sound.
II. Sounds of Meteorological Origin.

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II. Refraction Phenomena: Atmospheric Refraction.
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IV. Refraction Phenomena: Refraction by Ice Crystals.
V. Reflection Phenomena.
VI. Phenomena Due to Scattering: Color of the Sky.
VII. Phenomena Due to Scattering: Sky Polarization.

Part V. Factors of Climatic Control.

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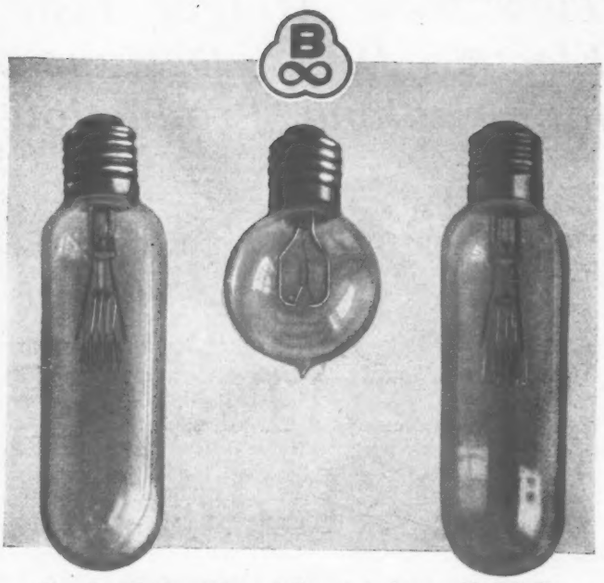

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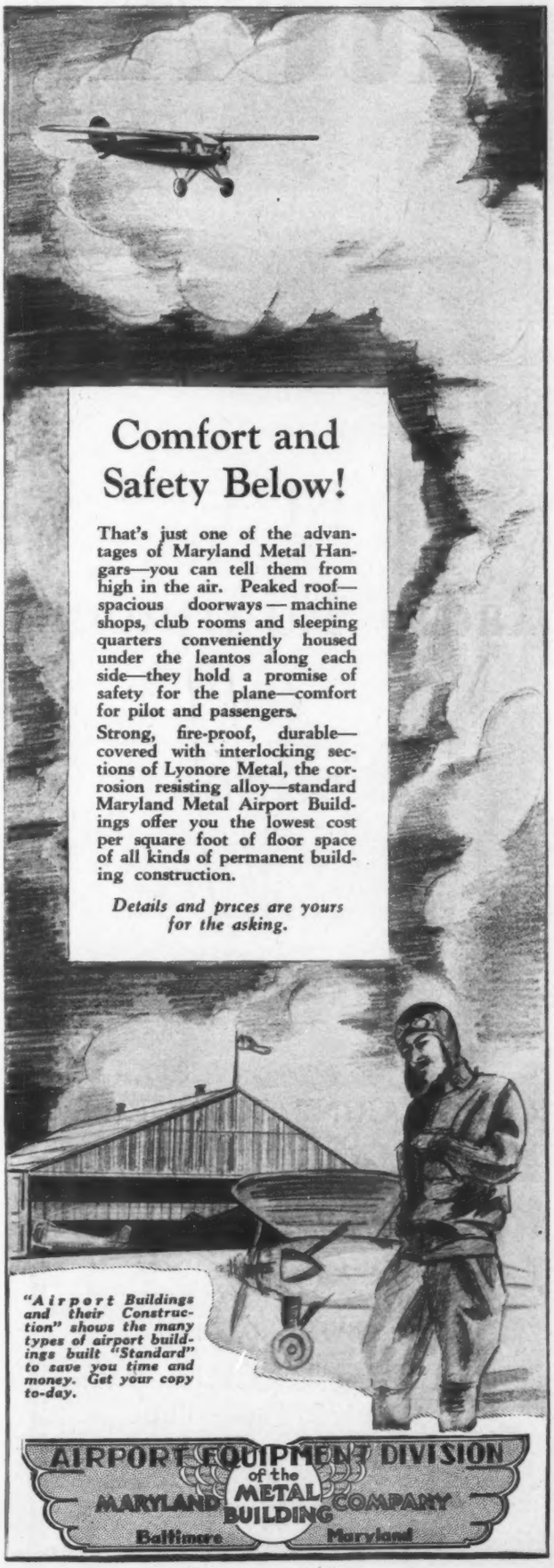
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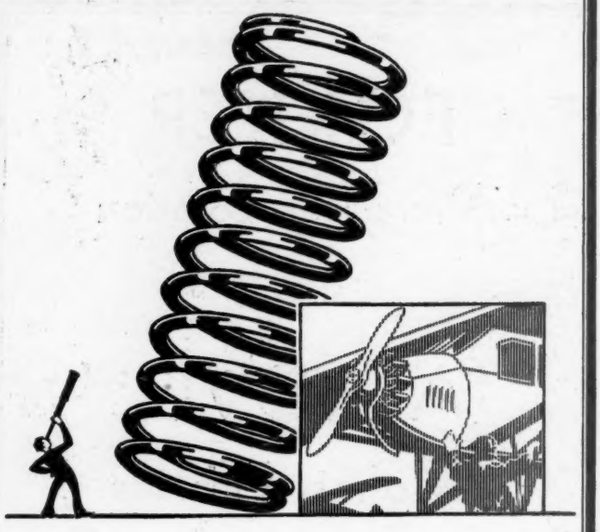

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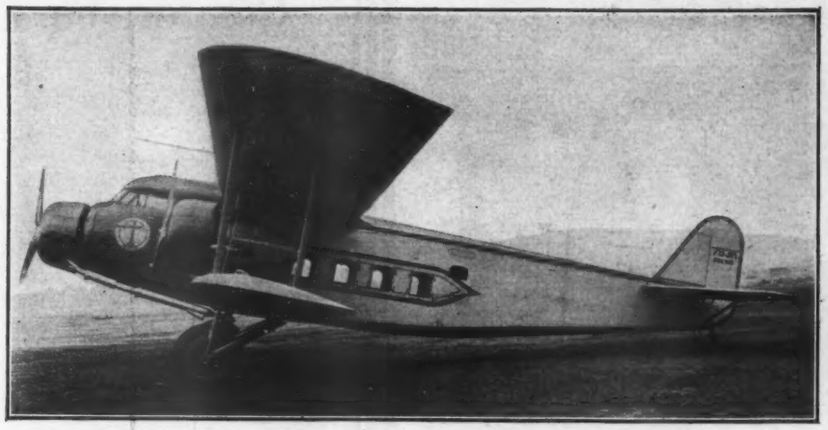

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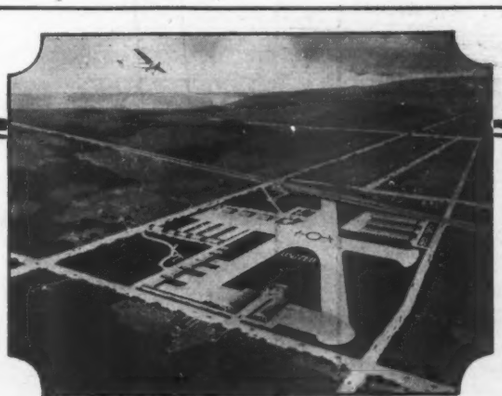

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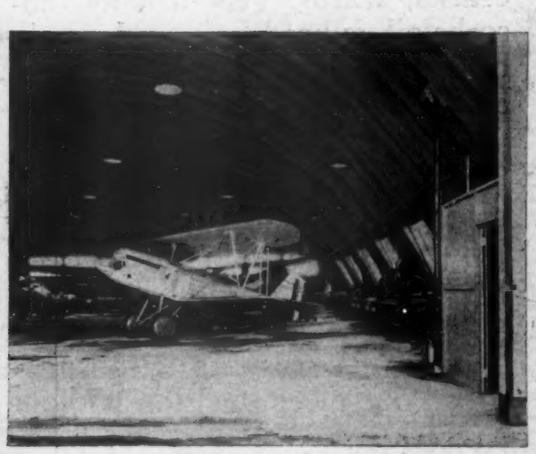

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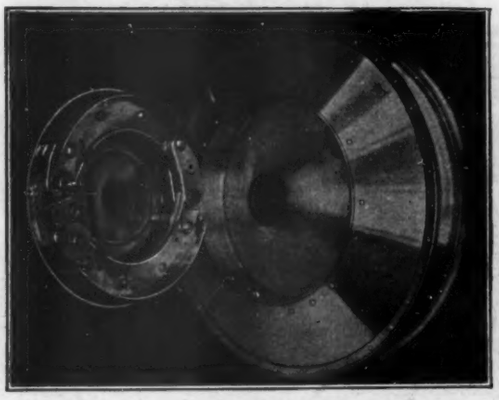

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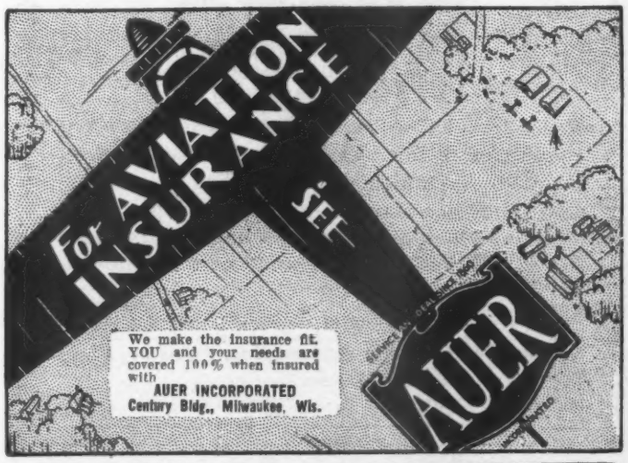
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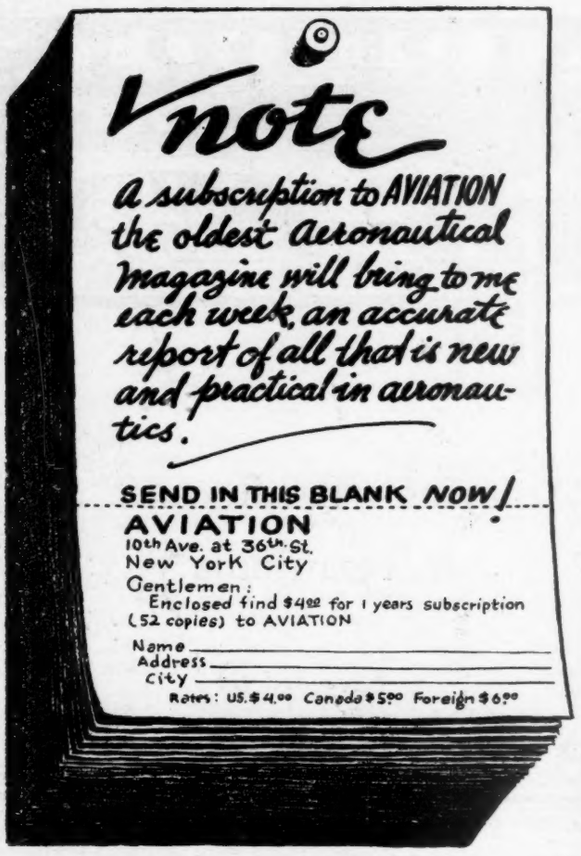
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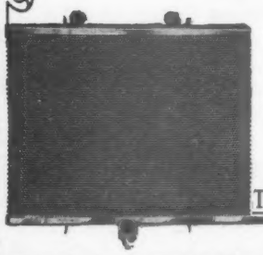
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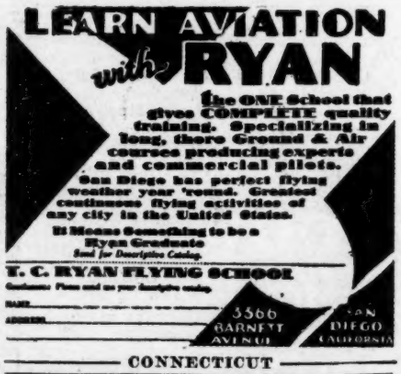
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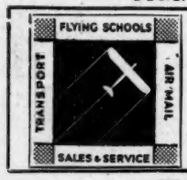

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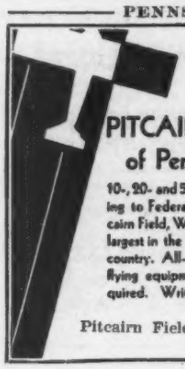

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SALMSON 230 horsepower, 9 cylinder radial complete, perfect condition, $395. Bristol Jupiter radial, $900. Anzani 35 horsepower, three cylinder, $200, propeller $25, 9 cylinder Gnome 50 horsepower, $125. Motor overhaul revolving stands $40. Hispano 220, new, $250. Hispano exhaust sticks $25. Tail units and wings for Spad, Avro, Neuport, Salmson. Tail skid dollies complete $45. Marvin A. Northrop Aeroplane Company, 730 Washington Ave. North, Minneapolis, Minnesota.

TERRITORY and ships for distributor for aeromarine Klemm in Virginia, West Virginia or North Carolina. Good proposition. Sikorsky Jennie a bargain; like new; completely overhauled OXX-6, Millerised, just test flown; outperforms anything for its horsepower. Roanoke Airways, Inc., 372 Walnut Ave., Roanoke, Va.

TWO Waco 10's, OX-5 motor, both ships licensed, equipped with complete Miller valve action. Price $1,400 and $1,500. Harry Anderson, 2125 David Stott Bldg., Detroit, Mich.

TRAVEL AIR OX-5, $2,000, 444 hours. Never been cracked up. The Columbus Flying Service, Norton Field, Columbus, Ohio.

TYPE 2000 Travelair biplane with OX-5 motor —A-1 condition. Good as new. Delivery made with approved United States Airworthy Commercial Certificate. Demonstration arranged near Alexandria Bay, New York—covers and motor in excellent condition. Price right. Write or wire, Jenny Aircraft & Boats Limited, Kingston, Ontario.

WACO 10, with OX-5 engine, new in June, commercial license, $2,750 f.o.b. Saskatchewan. FS-278, Aviation, Tenth Ave. at 36th St., New York.

WACO 10 for sale, motor just overhauled, new valve guides and oversize valves, Miller intake, motor turns 1,440 on the ground. New Hamilton propeller and Paragon spare. Ship never cracked up or hurt. Less than 400 hours. Flies hands off. Price for cash $1,750. Lendol F. Sliter, 122 South Main Street, Dolgeville, New York.

WACO 9, OX-5, good condition. Dual control, compass, new propeller. Recent overhaul. $1,200. Matt Kadin, 15 Euclid Pl., New Rochelle, N. Y.

WHEELS, new, 750 x 125 $10, 700 x 75 $5, 850 x 150 $12, tires also. Booster magneto English Bosch copy, $15, new. Floodlights airports night flying, $35. Marvin A. Northrop Aeroplane Co., 730 Washington Ave. North, Minneapolis, Minnesota.

WRIGHT motor and hub, 165 hp., never out of case, $2,600. William F. Voll, 255 Eastern Parkway, Brooklyn, N. Y.

EQUIPMENT WANTED

WANTED—Arrow Sport, with or without motor, in any condition. Leonard Reynolds, Box 123, Westport, Mass.

WANTED: Waco (9) wings and rudder, also propeller. Lawrence Forbes, 701 State St., Ogdensburg, N. Y.

POSITIONS VACANT

AERONAUTICAL production draftsmen wanted, with considerable aircraft experience. Write attention Chief Draftsman, Sikorsky Aviation Corporation, College Point, L. I., N. Y.

Over 20,000 other men in the aeronautical industry will see this page. Advertise here for quick results.

POSITIONS VACANT

AIRPLANE draftsmen, first-class, with thorough experience in airplane design. Accustomed to making and designing and stressing components and fittings. A good general knowledge of airplane structural and aerodynamics desirable. Give full particulars of experience and testimonials and salary desired. Communications held confidential. Whittelsey Manufacturing Company, Inc., Howard Ave. & Spruce St., Bridgeport, Conn.

EMPLOYMENT SERVICE

WE have openings for pilots, ground school instructors, mechanics, draftsmen, machinists, etc. If looking for work just write or wire the Aviation Employment Service, 820 Citizens Bank Bldg., Wilmington, Del., and watch the results.

POSITIONS WANTED

BUSINESS manager who has had unquestionable experience, capable of assuming complete charge of purchasing, stock and accounting departments. Can also assist with sales. PW-268, Aviation, Tenth Ave. at 36th St., New York.

GEOLOGIST, M.S. degree, limited commercial pilot's license; five years' experience major oil companies, desires position combining geology and flying. 1527 W. Pulaski St., Fort Worth, Texas.

TRANSPORT pilot, age 26, nearly 500 hours barnstorming, instruction and cross country. Will consider change with growing concern. PW-277, Aviation, 520 No. Michigan Ave., Chicago, Ill.

TRANSPORT pilot; several years' experience, airport manager, operations manager, purchasing agent, director of schools; previous experience five years sales manager for large corporation; age 34; married; excellent record; best references; employed at present; available October 15th. Prefer position requiring some flying or school work. PW-276, Aviation, 520 No. Michigan Ave., Chicago, Ill.

TRANSPORT pilot, experienced instructor, cross country and barnstorming. Reliable, references. Prefer Chicago home port. PW-274, Aviation, 520 No. Michigan Ave., Chicago, Ill.

(Continued on Page 69)

TECHNICAL SERVICE
217 Broadway, New York City
Specialists in Technical Personnel
CHEMICAL ELECTRICAL CIVIL
MECHANICAL AVIATION

Aviation—Employment Available
now in Milwaukee for men who desire to earn while learning aviation. Training is in our shops, classrooms and on the airport. No experience necessary. Write for information without obligation.
AERO CORPORATION OF AMERICA
Employment Department AV,
63 Second St., Milwaukee, Wis.

POSITION WANTED
PROGRESSIVE SALES MANAGER
To successfully combat the keener sales competition in the aircraft field today, a man with ten years' selling experience in airplanes and engines, will consider a position as sales manager with reputable aircraft manufacturing concern.
For personal interview address
PW-275, Aviation
Tenth Ave. at 36th St., New York City

PHOTOGRAPHER
Capable, experienced industrial, press and commercial photographer with thorough and complete knowledge outdoor and studio picture work desires to connect with growing concern in aeronautical industry. Age 28; has own outfit; available immediately; excellent references; go anywhere.
PW-271, Aviation
Tenth Ave. at 36th St., New York City

AUCTION

Sale of Navy Surplus and Surveyed Material

BY PUBLIC AUCTION

AT THE
NAVY YARD, NORFOLK, VA.
AT 10:00 A. M.

24 OCTOBER 1929

The following material will be offered:

5,000,000 pounds (approx.) Ferrous Metals
200,000 pounds (approx.) Nonferrous Metals
20,000 pounds (approx.) Wire Rope
50,000 pounds (approx.) Rope, scrap, hawser

Machine Tools	**Drills**	**Furniture**
Radio Material	**Lumber**	**Mess Gear**
Aeronautical Material	**Liberty Engines**	**Clothing**
Office Equipment	**Automobile Parts**	**Pumps**
Boat and Ship Fittings	**Electrical Material**	**Bicycles**
Binoculars	**Navigational Material**	**Small Boats**

AND MANY OTHER ITEMS

The auctioneer for this sale will be Gus Eichberg, 462 Pennsylvania Avenue, N. W., Washington, D. C. Catalog 651-A contains all available information, details, description and terms of sale, etc., and can be obtained from the Supply Officer, Navy Yard, Norfolk, Va., or the

Bureau of Supplies and Accounts
Navy Department, Washington, D. C.

AUCTION AUCTION AUCTION

FOR SALE

Ryan Brougham

with Wright J-5

Fully equipped, 162 hours. Inertia starter, turn and bank, climb indicator, heater, compass, brakes, pneumatic tire tail wheel. Always in hangar. Motor and ship guaranteed perfect condition.

Price, $4,000

Joseph H. Dotterweich
438 Pratt St., Buffalo, N. Y.
Jefferson 1101—Telephone—Fillmore 6399

FOR SALE AT A BARGAIN

Tapered Wing Waco

This ship was Maj. John P. Woods personal racing ship.

Wire for price and details.

Northern Airways, Inc.
Wausau, Wis.

FOR SALE

Three J-5 Ryan Broughams
engines recently overhauled.

Two NEW Six-Place Wasp Lockheeds
test flown only.

Also Several Waco 10's
Priced to sell quickly.
Wire or write

Washington Flying Service, Inc.
239 National Press Bldg., Wash., D. C.

FOR SALE

MOTOR

Stearman, Wright J-5 Motor, excellent condition. Never crashed. Time flown 350 hrs. Equipped with complete Pioneer instrument board and night flying accessories, spare gas tank. Change of equipment only reason for sale.

Cox & Stevens Aviation Corporation
521 Fifth Avenue, New York City

For Sale

All Metal Flying Boat

(Demonstrator)

A unique opportunity to purchase a five place open-cockpit flying boat powered with J-5 Whirlwind — Five hours since complete factory overhaul—new wings, tail surfaces and instruments.

NC License 4667 — Never cracked-up.
750 Pounds pay load.

At present in commission at Port Washington, L. I.

Price reasonable.

For Information Apply to

Ireland Aircraft Inc.

Garden City, N. Y.

Telephone—Garden City 5500

Travelair Speedwing Curtiss Challenger Engine

Flown less than fifty hours. Complete set of instruments, brakes, self-starter, etc. **Price $5,000.** Stengel, Columbus 7700—70 Columbus, New York City.

FOR SALE

$8500 J-5 New Standard

Used one month. Special equipment and paint job. Ideal for barnstorming, cross country or blind flying. 90 gal. tanks. Four passengers and pilot. Write

ARTHUR MENKEN
34 W. 52nd St., New York City

To make room for new equipment we are offering for sale a

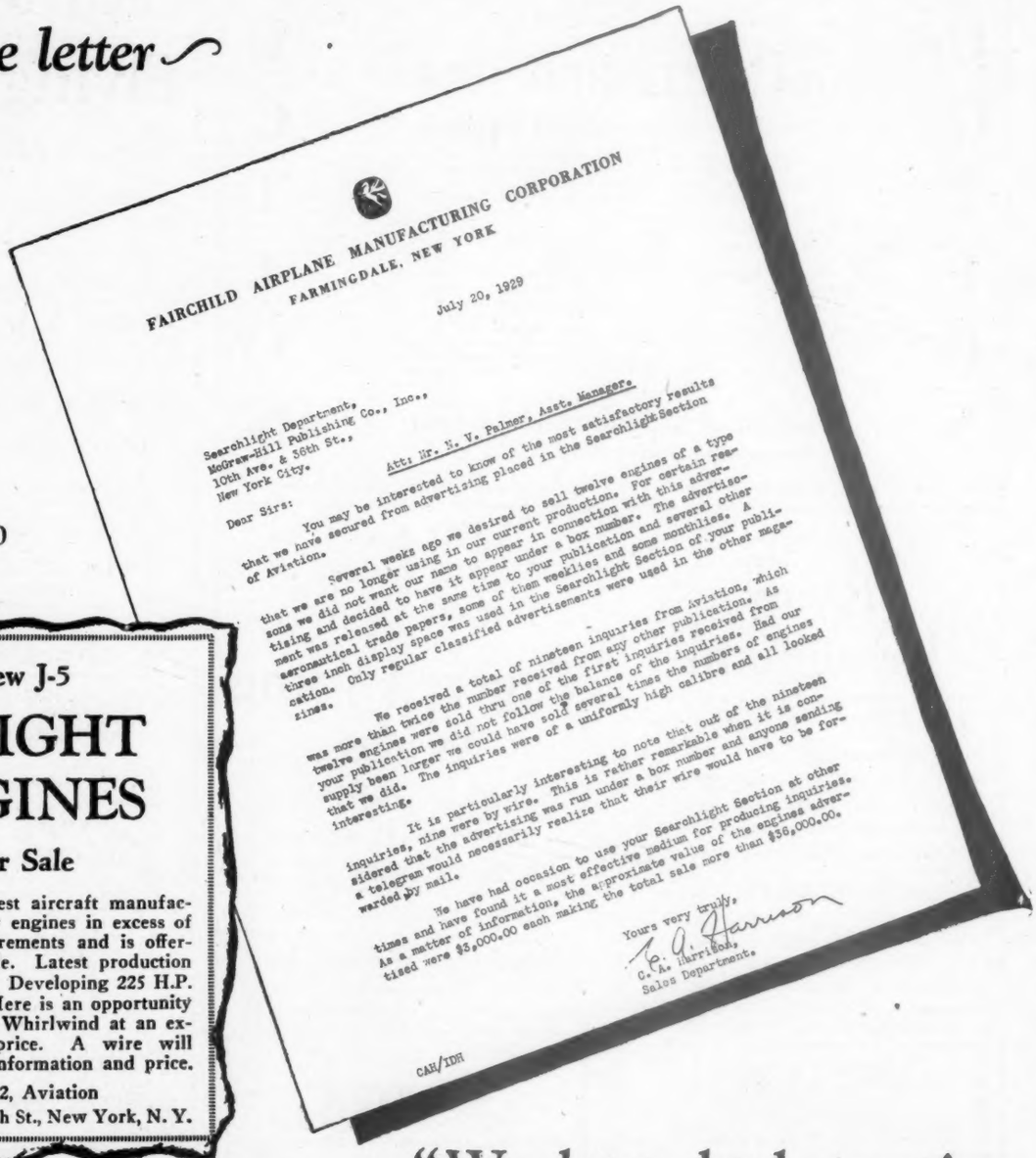
Ryan B-1, J-5 in A-1 condition

MASSACHUSETTS AIRWAYS CORPORATION
Springfield Airport, Springfield, Mass.

An $18.00 ad that produced sales of more than $36,000.00

Read the letter

This is the ad that sold 12 engines worth more than $36,000.00



FAIRCHILD AIRPLANE MANUFACTURING CORPORATION
FARMINGDALE, NEW YORK

July 20, 1929

Searchlight Department,
McGraw-Hill Publishing Co., Inc.,
10th Ave. & 36th St.,
New York City.

Attn Mr. N. V. Palmer, Asst. Manager.

Dear Sirs:

You may be interested to know of the most satisfactory results that we have secured from advertising placed in the Searchlight Section of Aviation.

Several weeks ago we desired to sell twelve engines of a type that we are no longer using in our current production. For certain reasons we did not want our name to appear in connection with this advertising and decided to have it appear under a box number. The advertisement was released at the same time to your publication and several other aeronautical trade papers, some of them weeklies and some monthlies. A three inch display space was used in the Searchlight Section of your publication. Only regular classified advertisements were used in the other magazines.

We received a total of nineteen inquiries from Aviation, which was more than twice the number received from any other publication. As twelve engines were sold thru one of the first inquiries received from your publication we did not follow the balance of the inquiries. Had our supply been larger we could have sold several times the numbers of engines that we did. The inquiries were of a uniformly high calibre and all looked interesting.

It is particularly interesting to note that out of the nineteen inquiries, nine were by wire. This is rather remarkable when it is considered that the advertising was run under a box number and anyone sending a telegram would necessarily realize that their wire would have to be forwarded by mail.

We have had occasion to use your Searchlight Section at other times and have found it a most effective medium for producing inquiries. As a matter of information, the approximate value of the engines advertised were $5,000.00 each making the total sale more than $56,000.00.

Yours very truly,
C. A. Harrison,
Sales Department.

CAH/IDR

New J-5

WRIGHT ENGINES

For Sale

One of the largest aircraft manufacturers has a few engines in excess of production requirements and is offering them for sale. Latest production and never used. Developing 225 H.P. at 1800 r.p.m. Here is an opportunity to secure a new Whirlwind at an exceedingly low price. A wire will bring complete information and price.

F. S.-52, Aviation
Tenth Ave. at 36th St., New York, N. Y.

"We have had occasion to use your Searchlight Section at other times and have found it a most effective medium for producing inquiries"

Turn YOUR used and surplus equipment into CASH. Mail a list of the equipment you have for sale to the Searchlight Department and let us tell you exactly how much it will cost to advertise it. Address: SEARCHLIGHT DEPARTMENT, Tenth Avenue at 36th Street, New York City.

FOR SALE

FINE PLANT FOR BUILDING AMPHIBIAN PLANES

Complete Machine Shop and Wood Shop—Assembly Sheds—
Two Launching Ways—WATER OPEN YEAR ROUND
ONE AND ONE-HALF MILES TO GENEVA AIRPORT

A REAL OPPORTUNITY at a REAL BARGAIN

FAY & BOWEN ENGINE CO.

GENEVA, N. Y.

SALESMEN WANTED

(Continued from Page 67)

FORTUNE in airplane sales. Under this plan a salesman should sell at least one Eaglerock a month—a net monthly income for him of from $1,000 to $1,500. Our two weeks free sales training course makes you ready to get the money. We equip salesmen who qualify with a free demonstrator Eaglerock. You can offer buyers an easy plan of time purchase. Write for details. Alexander Aircraft Co., Dept. 11, Colorado Springs, Colo.

HANGAR SPACE AVAILABLE

HANGAR space in a beautiful all-steel hangar, located at Fitzmaurice Flying Field, Massapequa Park, L. I. Very convenient to all sorts of transportation. Aerial storage, repairs, gas and oil. Private field. Very small traffic. Apply Airoscript Corporation, 393 Seventh Avenue, New York City. Telephone Penn. 5793.

BUSINESS OPPORTUNITIES

Partners Wanted

VETERAN pilot wants partner in, or close by Cleveland to buy plane on 50/50 basis. BO-260, Aviation, 520 N. Michigan Ave., Chicago, Ill.

DESIGNER-CONSTRUCTOR. 12 years' experience. Has flight-tested design, small sport plane. Connection with individual or organization to finance production desired. BO-273, Aviation, 520 No. Michigan Ave., Chicago, Ill.

Business For Sale

Profitable well established aircraft business in Detroit. Will take five thousand to eight thousand dollars to finance. Business will stand complete investigation. BO-263, Aviation, 520 No. Michigan Ave., Chicago, Ill.

BUSINESS OPPORTUNITIES

TWO European engineers with 21 years of aerodynamical experience, at present in charge of wind tunnel near New York City, would like to interest capitalists in manufacture of new type aircraft and flying novelties. BO-258, Aviation, Tenth Ave. at 36th St., New York.

MISCELLANEOUS

ATTENTION Aviators: Valve guides installed on OX cylinders, $1.50 per guide: removable valve seats installed, $1.00; descriptive literature upon request; all work guaranteed. Illinois Flying Co. New location, 4 West 4th St., Sterling, Ill.

MAGNETOS, tachometers, altimeters, air speed indicators. For expert test or repair service send them to Streed Electric Company 1312 Harmon Place, Minneapolis, Minn.

REBUILD your OX5 with removable graphite guides, inserted seats and oversize valve action pins. OX5 and Hisso parts. Write for circular. Heckman Machine Works, 4026 West Lake Street, Chicago, Illinois.

TO HELP YOU

LOCATE COMPETENT MEN

"Searchlight" Advertising

AVIATION Needs Trained Men

Aeronautical Engineering
Drafting Airplane Construction Rigging
Airplane and Engine Mechanics
Flying

As Outlined by Dept. of Commerce
Any of these courses will qualify you for one of the positions in aviation industry.

Free Employment Service
While Training and After Graduation.

Institution of Aeronautics
INCORPORATED
1780 Broadway at 57th st., New York, N.Y.

. . . . *Opportunity to Buy*

Cabin Plane and Design

One of the leading commercial aircraft manufacturers has an 8-place cabin monoplane, with design and engineering data, less Wright J-5 motor, for sale. The design is by a nationally recognized aeronautical engineer. The ship has been satisfactorily test flown and only the manufacturer's decision to concentrate in the small ship field prevents it being placed in production. This is an attractive purchase for a manufacturer who wishes to enter the cabin field with most research completed or for a newly incorporated company wanting something tangible to offer its stockholders. Priced for immediate action.

Box FS-172, Aviation Magazine
Tenth Ave. at 36th St., New York City

IF YOU do not find what you want in the Searchlight Section of AVIATION . . . . . then advertise for it!

AV-1

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WHERE TO FLY

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GETTING OFF TO A GOOD START

THE pilot who shoves off with -TP- Aero Motor Lubricating Oil in his engine has this advantage: he knows he is not going to have to worry about his oil. He has side-stepped a lot of unnecessary risks.

-TP- Oils are new—the latest development in scientific lubrication. They have been tested and approved by leading manufacturers of airplane engines and by many leading pilots. They are straight-run oils, not blended or compounded, produced from pure, paraffine-base crude by a process for which patents are pending.

This process has marked advantages over other methods. It removes all the paraffine wax, while preserving all the lubricating bodies in the crude. Elimination of the wax is responsible for its low cold test.

In terms of performance this means uniform viscosity at all working temperatures, minimum carbon deposit and ignition trouble from fouled spark plugs, easy cold priming, immediate oil pressure, perfect lubrication winter and summer, on the ground or at high altitudes—a maximum of safe flying hours.

A handsome, practical *Pilot's Log Book* sent free on request.

In Ohio It's -TP- SOHIO Aero Motor Lubricating Oil

Marketed in Ohio *Exclusively by* The Standard Oil Company of Ohio

-TP- Aero Valve Spring Lubricant

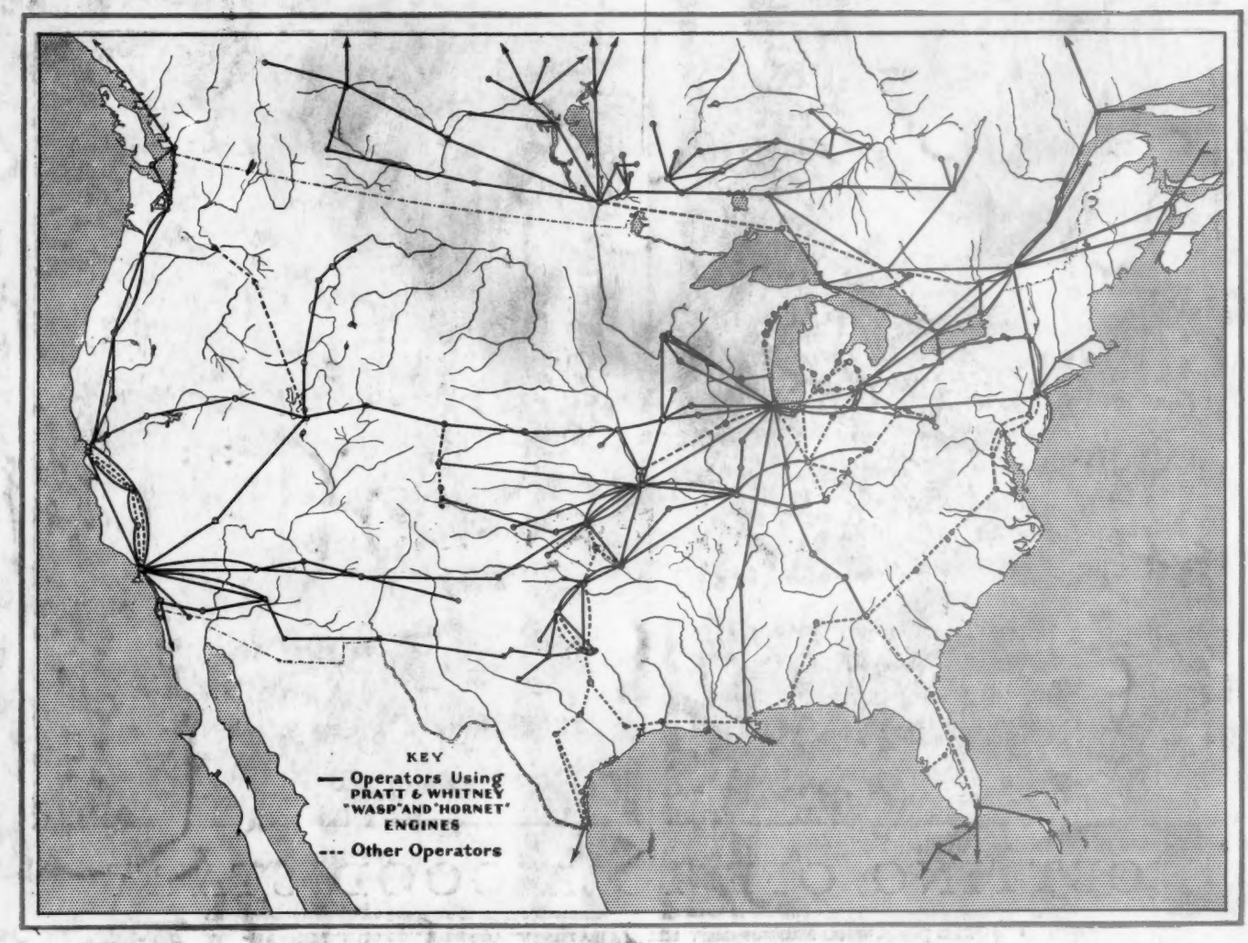
Also -TP- Aero Rocker Arm Lubricant

TEXAS PACIFIC COAL AND OIL COMPANY
FORT WORTH, TEXAS
New York St. Louis Los Angeles

-TP- AERO MOTOR LUBRICATING OIL

REG. U. S. PAT. OFF.

2779



Solid lines indicate air transport lines using Pratt & Whitney Wasp and Hornet engines; dotted lines show other air transport lines

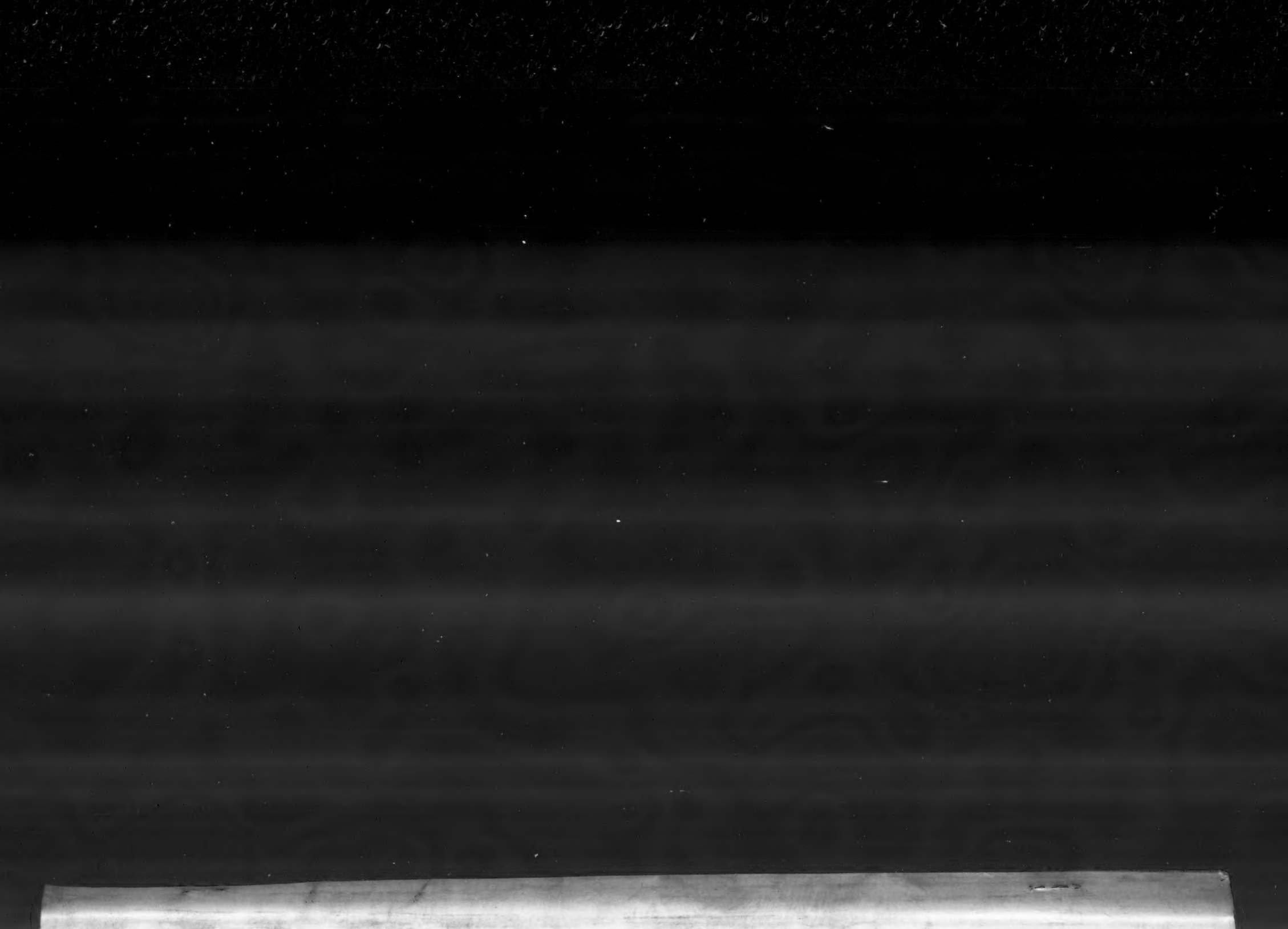
Where the "Wasp" and "Hornet" Fly!

NEW maps are in the making . . . maps of the highways of the sky.

Great air-transports . . . carrying air-mail, passengers and express on exacting schedules, now fly swift and fast above the jams of earth-tied traffic. These tri-motored winged Leviathans have become practicable only through the development of Dependable Flying Power.

The above map indicates the air routes over which the famous "Wasp" and "Hornet" engines are powering aerial travel in America . . . to say nothing of their service in foreign fields.

THE
PRATT & WHITNEY AIRCRAFT CO
HARTFORD - - - CONNECTICUT
Division of United Aircraft & Transport Corporation

Manufactured in Canada by The Canadian Pratt & Whitney Aircraft Co., Ltd., Longueuil, Quebec, in Continental Europe by The Bavarian Motor Works, Munich.

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